



University of Tennessee, Knoxville  
**Trace: Tennessee Research and Creative  
Exchange**

---

Masters Theses

Graduate School

---

8-2007

# Does National Policy Influence Individual Car Driving Behavior: A Cross-National Study of the European Union

Erika Lynn Borek

*University of Tennessee - Knoxville*

---

## Recommended Citation

Borek, Erika Lynn, "Does National Policy Influence Individual Car Driving Behavior: A Cross-National Study of the European Union."  
" Master's Thesis, University of Tennessee, 2007.  
[https://trace.tennessee.edu/utk\\_gradthes/258](https://trace.tennessee.edu/utk_gradthes/258)

This Thesis is brought to you for free and open access by the Graduate School at Trace: Tennessee Research and Creative Exchange. It has been accepted for inclusion in Masters Theses by an authorized administrator of Trace: Tennessee Research and Creative Exchange. For more information, please contact [trace@utk.edu](mailto:trace@utk.edu).

To the Graduate Council:

I am submitting herewith a thesis written by Erika Lynn Borek entitled "Does National Policy Influence Individual Car Driving Behavior: A Cross-National Study of the European Union." I have examined the final electronic copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Arts, with a major in Sociology.

Stephanie Bohon, Major Professor

We have read this thesis and recommend its acceptance:

Sherry Cable, Paul Gellert

Accepted for the Council:

Dixie L. Thompson

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

---

To the Graduate Council:

I am submitting herewith a thesis written by Erika Lynn Borek entitled “Does National Policy Influence Individual Car Driving Behavior: A Cross-National Study of the European Union.” I have examined the final electronic copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Arts, with a major in Sociology.

Stephanie Bohon

Stephanie Bohon, Major Professor

We have read this thesis  
and recommend its acceptance:

Sherry Cable

Paul Gellert

Accepted for the Council:

Carolyn R. Hodges

Carolyn R. Hodges, Vice Provost and  
Dean of the Graduate School

(Original signatures of file with official student records.)

Does National Policy Influence Individual Car Driving Behavior:  
A Cross-National Study of the European Union

A Thesis  
Presented for the  
Master of Arts  
Degree  
The University of Tennessee, Knoxville

Erika Lynn Borek  
August 2007

## Acknowledgements

I would like to thank my friends and family for supporting me during my transition through graduate school. Thank you to my committee, Stephanie Bohon, Sherry Cable, and Paul Gellert for countless hours of support and advice. Sherry and Chip: thank you for helping me pull through one of the most difficult times of my life. Thank you to Robert Emmett Jones and Harry Dahms for your excellent feedback and guidance. Thank you to my life-long friends without whom I would be lost. To my new friends, especially Casey and Bobby: what can I say other than what would I have done without circles and threes? To my family: thank you for motivating me to push myself to my potential. And to Clinton: you are my rock and inspiration. Thank you so much.

## Abstract

This study examines how the national policy climate affects individual driving behavior in the European Union. Using secondary data from the International Social Survey Program: Environment II 2000 in conjunction with national scores from the 2001 and 2002 Environmental Sustainability Indexes, I analyze the relationship between three macro-level predictors and the reduction of individual car driving. My results indicate that the national environmental policy climate positively relates with the likelihood of individuals driving less. Further individual's likelihood to reduce car driving is significantly affected by the individual's type of employment, education level, family income level, gender, age, and concerns toward the danger of air pollution for the environment and the respondent. Variables measuring respondent urbanicity, religiosity, and union/marriage status do not significantly affect individual driving behavior.

## Table of Contents

Chapter I: The Research Problem .....	1
Problem Statement .....	4
Global Warming.....	5
Purpose.....	8
Chapter II: Literature Review .....	10
Effects on Pro-Environmental Behaviors .....	14
Effects on Environmental Concern .....	17
Chapter III: Research Strategy.....	21
Sample.....	21
Data .....	22
The Dependent Variable .....	24
The Micro-Level Variables.....	25
The Meso-Level Variables.....	27
The Macro-Level Variables .....	30
Hypotheses.....	35
Limitations/Delimitations .....	36
Assumptions.....	39
Chapter IV: Results.....	42
Discussion .....	51
Conclusions.....	55
List of References .....	57
List of Appendices.....	66
Vita.....	71

## List of Tables

Table 1. Dependent Variable Measurement Code Type .....	25
Table 2. Micro-Level Variables Measurement and Code Type.....	26
Table 3. Meso-Level Variables Measurement and Code Type.....	28
Table 4. Macro-Level Variables Measurement and Code Type .....	33
Table 5. Environmental Sustainability Index Scores (Macro-level indicators) for Each Nation.....	34
Table 6. Descriptive Statistics, Percent or Mean with Standard Deviation .....	43
Table 7. Ordered logit effects of macro-, meso-, and micro-level predictors on reducing car driving (odds ratios shown).....	44



## **Chapter I: The Research Problem**

Studies show that national policies affect individual behaviors. Legal consequences that result from deviating from legislation may influence an individual to behave according to the rules. For example, a person may be less likely to exceed the speed limit because of costly fines. However, what if a government presents no legal consequences for individuals' behavior? For example, within EU countries that signed the Kyoto Protocol, government leaders implemented policies to reduce emissions; however, these policies target (and have consequences for) corporations' greenhouse gas emissions, not individual emissions. As such, the status of a nation's ratification of the Kyoto Protocol is not sufficient to predict the likelihood of an individual engaging in a behavior, such as car driving, not associated with legal ramifications within the Protocol.

If an international policy addressing the global need to reduce greenhouse gas emissions does not specifically limit an individual's behavior, what type of government actions are needed to change an individual's behavior? If an individual's behavior is not bound to any legal guidelines, can a government still influence individual behavior? I assert that national climate, including government actions and policies, influences individual behavior. Specifically, an individual's perception of his/her government's "policy climate" surrounding global warming may affect his or her behaviors, especially those dealing directly with emissions, such as car driving.

Though national, macro-level factors influence individual behavior, it is imperative to note that individuals also influence their governments. For example, the women's movement, the environmental movement, and the civil rights movement all resulted in a change in national policy. Understanding the reciprocal relationship

between government and the public is important for today's international problems, e.g. global warming, that require a change in both individual and government actions.

However, changing individual behavior can be difficult. Individual behavior is a product of many factors, including the individual's concerns, beliefs, external influences, and behavioral intentions (Fishbein and Ajzen 1975). As such, attempting to solve a large, international problem, such as global warming, by targeting the individual poses a huge problem, since every individual holds unique beliefs, experiences different social influences, and has different intentions. Contrastingly, national policies represent overarching guidelines that may be more easily changed and are shown to affect individual behavior. Thus, in order to solve problems that affect every individual, implementing solutions at a societal, national, or international level (as opposed primarily targeting the individual level) may be more effective at producing the desired results.

For a fuller understanding of how and why people act, we must consider the stage upon which an individual must act. Institutional structures possess an inherent power over society's actors, functioning in two capacities: to limit *and* enable the actor (Giddens 1984). That is, the actor can only act within the boundaries of the structure; in turn, this structure enables the actor to engage in the activities "permitted" within the structure. Metaphorically, institutional structure serves as a color palette from which an actor can create his life; however, the provided colors limit the individual's choice and actions. Thus, a study which examines the causes of individual behavior would be incomplete without the inclusion of social structural variables. Specifically, to reduce human contributions to global warming, we must understand how factors at all social levels affect individual behaviors.

In this paper, I explore if actions at the national, governmental level affect individual behavior. Specifically, I examine how a nation's environmental sustainability influences an individual's reduction in car driving. Studies show that macro-level factors, including international (such as the Kyoto Protocol) and national policies, affect individual behavior (Kempton, Darley, and Stern 1992; Engel and Potschke 1998; Wernet, Elman, and Pendleton 2005; and the Gallop Poll 2007). Behaviors are also affected by the agents of socialization, or meso-level factors, such as education and employment (Inglehart 1990; Kohn and Slomczynski 1990; Hays 1992; Kanagy, Humphrey, and Firebaugh 1994; De Almeida, Machado, and Da Costa 2006). Similarly, micro-level factors, such as individual attitudes, beliefs, and demographics can affect behavior.

I model my study upon Wernet, Elman, and Pendleton (2005), who utilize a three-level structural distinction proposed by House (1981, 1995) to identify how pro-women policies affect individual pro-women concerns/behaviors. They conclude that institutional (macro), as well as structural (meso) and individual (micro) factors positively relate with individual support for gender equality. It is my contention that the methodology and conceptual model used by Wernet and her colleagues can be modified and applied to study how macro-, meso-, and micro- factors affect environmental support and behaviors. In my research, I propose to replicate this structure, as it offers a refinement of other multi-level approaches, which I discuss in the literature review, including those in environmental sociology.

I investigate the effects of macro-, meso-, and micro-level factors on a behavior closely linked to global warming: car driving. Specifically, I will examine how

government environmental action and policy relate to individual decisions to reduce car driving behavior due to concerns about the environment within the European Union. Although the United States will not be included in my analysis, it is my hope that this study of policy and behavioral change in Europe will offer insight into how future policy in the United States may affect individual behaviors.

### *Problem Statement*

Though driving a car may often be thought of as an individual choice, studies indicate, “individual values, attitudes, and behaviors are deeply embedded within macro social structures” (Wernet, Elman, and Pendleton 2005, 339). Consequently, the effect of macro-level factors, such as national environmental policies, government participation in international efforts, and subsidies for energy should be considered when studying individual behavior (Inkeles and Smith 1974; Lauer 1977; Inkeles 1983; Inglehart 1990, 1997; Kohn et al 1997). For example, individuals are more likely to recycle if the local government provides nearby recycling facilities and curbside collection (Olander & Thøgersen 1995).

Additionally, meso-level or social-structural factors influence behavior. Social variables, particularly those of education, employment, and the economy (Wernet, Elman, and Pendleton 2005) affect our concerns and behaviors. Understanding how these meso-level factors influence environmentally damaging behaviors, such as car driving, is also important. Additionally, micro-level factors contribute to understanding why specific behaviors occur. Moreover, macro-, meso-, and micro-level factors are

likely to interact, sometimes in reciprocal ways, as they affect individuals.

### *Global Warming*

Though today, the process of global warming is considered negative, global warming is a natural occurring phenomenon: the earth's thin atmosphere traps some of the sun's radiated energy, while the remainder escapes back into the universe. This process warms the planet and creates a climate which has been suitable for human life. However, the burning of fossil fuels creates byproducts that accumulate in the earth's atmosphere, thickening the naturally thin layer of insulation. Thus, more of the sun's energy is trapped by this thickening atmospheric blanket, increasing the earth's natural temperature (Gore 2006).

In the past few years, anthropogenic global warming has become recognized as perhaps the most important environmental issue facing the human race. The international scientific community asserts "that the globally averaged net effect of human activities since 1750 has been one of warming...." (2007, 5). Global warming poses a serious threat to the planet (Intergovernmental Panel on Climate Change 2007). One of the likely consequences of global warming includes meteorological shifts, which threaten severe droughts in some areas and serious flooding in other locations. If the polar ice caps continue to melt, sea levels will rise up to 20 feet, displacing millions of people from their homes (Gore 2006).

By implementing behavioral changes, individuals can decrease their carbon dioxide output and lessen their impact on global warming. Decreasing automobile use

may yield the most significant benefits. The United States Environmental Protection Agency (US EPA) asserts: “The transportation end-use sector accounted for...approximately 32 percent of CO<sub>2</sub> emissions from fossil fuel combustion” (2001, 15) and “fifty-seven percent of the emissions from [the transportation] end-use sector were the result of combustion of motor gasoline in passenger cars and light-duty trucks” (2001, 9). Additionally, the European Environment Agency (EEA) reports: “Road remains by far the most polluting passenger transport mode with respect to CO...emissions” (2004a, 3) and they expect greenhouse gas emissions to rise (Figure 1). Though overall, the EU-25 countries decreased total greenhouse gases by 5% between 1991 and 2004, efforts directed towards personal vehicle emissions have been insufficient “to neutralize the increase in traffic and car size....” resulting in a 26% rise in CO<sub>2</sub> emissions from road transport (Europa 2007). Further, “passenger cars remain the most polluting and least energy efficient passenger transport mode in terms of specific CO<sub>2</sub> emissions and energy consumption, respectively” (EEA 2004b, 6).

With increased media coverage on global warming, including the film *An Inconvenient Truth*, most individuals are aware of the severity of the potential consequences. Further, individuals in the United States and the European Union believe that their government leaders need to quickly address anthropogenic climate change. The PEW Research Center finds that 74 percent of Americans identify global warming as a very serious or somewhat serious problem (2006) and 55 percent state that global warming is a problem that requires immediately government attention (2007). Within the European Union, 92 percent of respondents state that governments should intervene with

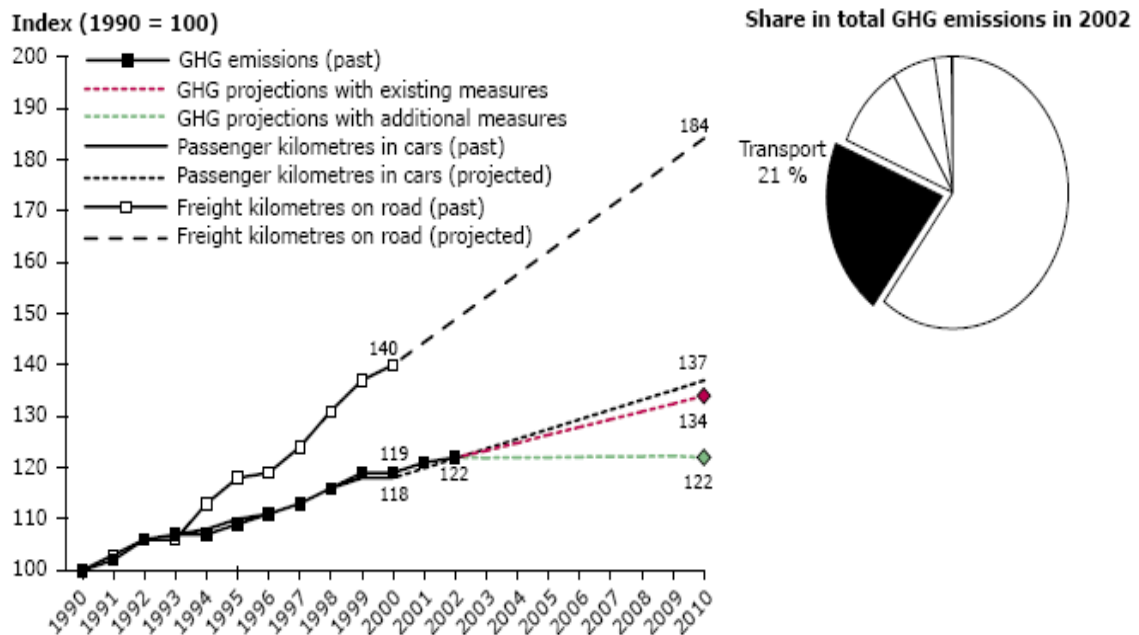


Figure 1. EU-15 past and projected greenhouse gas emissions from transport, passenger kilometers in cars and freight kilometers on road and share of the sector in total GHG emissions (EEA 2004c, 69)

tax incentives, research funding, or prohibition of non-energy efficient products (The Gallop Commission 2007). However, it is important to note that most government environmental regulations restrict business practices, not individual behaviors. Policies that limit the individual, such as the frequency car driving, do not exist in the United States or the European Union. Thus, though individuals assert that they want government action, what voluntary actions are they taking to reduce personal emissions? Are individual behaviors influenced by government actions or the individual's perception of these actions?

## *Purpose*

The aim of this thesis is to engage in an exploratory study of how institutional variables affect individual behaviors i.e. reduced car driving. Using data from European respondents to the International Social Survey Program: Environment II 2000 (ISSP), I conduct an ordered logit analysis to determine the effects of micro-, meso-, and macro-level factors on responses to the question, “How often do you cut back on driving a car for environmental reasons?”

My study follows House’s conceptual model, which describes how individual behaviors are affected by three levels of structural variables: components, proximity and psychological, relating, respectively, to macro, meso, and micro levels. I also draw on the analytic model developed by Wernet, Elman and Pendleton (2005), whose research examines how policies can be enacted at the national level to have a real impact on individual behavior. Wernet, Elman, and Pendleton posit that the presence of pro-women policies positively relates to pro-women concerns and behaviors. They conclude that pro-women behaviors, such as support for gender equality, are positively related to the incidence to pro-women policies and institutions.

Similarly, I assert that pro-environmental policies, measured by national scores on the Environmental Sustainability Indexes, will relate with a higher incidence of reduced car driving. By investigating the connection between individual car-driving behavior and macro-level factors (environmental regulation, international environmental commitments, and energy subsidies), I will explore how actions at the national level affect individual driving behavior.



By engaging in this type analysis, I can gain insight into the question of whether or not pro-environmental structures encourage individual pro-environmental behaviors. I focus on automobile use because the US EPA and the EEA indicate that passenger and light-duty vehicles rank highest in total emissions and lowest in energy efficiency (US EPA 2001; EEA 2004a; EEA 2004b).

It is my hope that my study of the European Union will provide an example of how national policies can be enacted to influence individual behavior. A parallel can be drawn between the member states of the European Union and the individual states of the America in that each has the power to enact stricter environmental laws, but is still bound to national policy guidelines. With the consequences of global warming on the horizon, it is only a matter of time before US leaders must act to alleviate the human contributions to climate change. Thus, analysis of the effect of EU state policies may contribute to the success of future US climate change policies.

## **Chapter II: Literature Review**

To be effective, solutions to environmental problems must be thorough and comprehensive. Individual behaviors, such as car driving or recycling, depend not only on individual characteristics such as gender and age, but on external factors such policy and socialization processes. Sociologists increasingly recognize that an understanding of human behavior requires analysis of macro-, meso-, and micro-level factors (House 1981, 1995). Examples of macro-level factors include national policy, international commitments, and budget allotment priorities, to name a few. Education, occupation, and income levels are agents of socialization, which are categorized as meso-level indicators (Dietz, Stern, and Guagnano 1998; Wernet, Elman, and Pendleton 2005; De Almeida, Machado, and De Costa 2006). Micro-level variables refer to individual characteristics, such as age, gender, union status, and concerns.

In this section, I first present House's conceptual model, explaining how his three levels (macro-, meso-, and micro) of social factors can affect an individual's behavior. Also, I discuss several studies which utilize House's conceptual model to predict individual behaviors (including environmental behaviors). In the second subsection, I detail studies that show that macro-, meso-, or micro-level variables affect individual's environmental behavior. Also, I touch upon how individual environmental behavior has been linked to individual environmental concern. With this in mind, in my third subsection I discuss studies that successfully demonstrate a relationship between macro-, meso-, and micro-level factors with an individual's environmental concern.

### *The Conceptual Model*

House (1981, 1995) creates a model to explain how an individual's personality (concern and behavior) is affected by the components (macro), proximity (meso), and psychological (micro) principles. My study follows House's conceptual model; I utilize his three categories to frame my independent variables of interest, in order to predict individual behavior.

House (1981, 540) defines macro-level, or component, factors as the "social structure...or system" and "bounded patterns of behavior...and the tangible or material forces that tend to maintain such patterns..." (1995, 390). Macro-level factors, such as regional and national properties (Engel and Potschke 1998), government actions (Olander and Thorgersen 1995), and subsidies (Kempton, Darley, and Stern 1992) affect individual's pro-environmental behaviors.

Meso-level factors can be conceptualized as the middle stage between individual (micro) and institutions (macro). Specifically, meso-level factors measure the ways in which larger social structure influences the individual (House 1981, 1995). Sociologists generally think of meso-level variables -- or "proximity principles" (House 1981) -- as the influences of socialization or, more often, exposure to the agents of socialization. For example, education, religious institutions, and work type are agents of socialization, so proxies such as years of education, income, religiosity and employment type are often employed as meso-level factors in research (Inglehart 1990; Kohn and Slomczynski 1990; Hays 1992; Kanagy, Humphrey, and Firebaugh 1994; De Almeida, Machado, and Da Costa 2006).

House and Mortimer explain micro-level factors as “*psychological* processes through which individuals perceive and respond to stimuli” (1990, 72). Micro-level characteristics such as age, gender, race, and marriage status act as a filter for the individual behavior. Jones and Dunlap (1992), Mohai (1992), Stern, Dietz, and Kalof (1993), Davidson and Freudenberg (1996), Blocker and Eckberg (1997), Fortmann and Kusel (1999) and other studies conclude that micro-level variables affect individual environmental behaviors and environmental concern.

Most researchers listed above utilize only one of House’s three structural variables (either macro-, meso-, or micro-) in their analyses of individual behavior. However, many researchers use variables from two or three levels to predict individual behavior and concern. For example Wernet, Elman, and Pendleton (2005) consider how an individual’s support for a pro-women state is affected by demographics, employment type, household income, level of education, and pro-women states.<sup>1</sup> The authors conclude find micro-level variables (age, gender, and life satisfaction), meso-level variables (employment type, household income, and level of education), and macro-level variables (three measures of pro-women states) explains 26% of the variance in individual pro-women behaviors, including support for women’s equality in employment, compensation, and government rights.

Additionally, Engel and Potschke (1998) study how a specific environmental behavior is affected by institutional (macro), structural (meso), and individual (micro) factors. Using data from the 1993 International Social Survey Programme, Engel and

---

<sup>1</sup> The seven pro-women state indicators include number of women in school, the legal status of abortion, life expectancy for women, maternity leave policies, fertility rates, and the percent of women in public life in minister and parliament, from which Wernet her colleagues constructed three factors: Policies and Power, Reproduction Issues, and Female Education.

Potschke consider people's willingness to pay for the environment (with higher prices and taxes) and reduce their frequency of car driving. The authors sample nine countries to determine the variance explained by differences within regions, between regions, and between countries. Although meso- and micro-level variables explain the largest share of variance in individual behavior, Engel and Potschke conclude that regional and national factors, such as policy, account for a substantial portion of the variance in individuals' willingness to pay for the environment and reduce car driving. Also, they conclude that income positively correlates with willingness to pay much higher prices/taxes and to accept cuts in the standard of living: as family income increases, individuals are more willing to pay higher prices/taxes and accept cuts in their standard of living. Similarly, the likelihood to cut back on driving a car also increases as family income increases.

In sum, House (1981, 1985) provides a conceptual model which many researchers utilize to determine how different levels of social variables affect individual behavior. I apply this conceptual model in my study of the effects of the national policy climate on individual car driving behavior. By examining the effect of policy in conjunction with other meso- and micro-level variables, I contribute to the understanding of how individuals may internalize national environmental policies. However, since most EU climate change legislation targets corporations and businesses and does not directly target ordinary individuals, individuals' choice to reduce car driving is voluntary and not enforceable by law. Therefore, an analysis of the individual behaviors would be incomplete with the inclusion of only macro-level variables, such as national policy. By adding meso- and micro-level variables to my analysis, I can understand how factors at

all three levels of House's conceptual model affect an individual's engagement in voluntary, pro-environmental behaviors.

### *Effects on Pro-Environmental Behaviors*

As shown above, macro-, meso-, and micro-level factors affect individual behavior. Wernet, Elman, and Pendleton (2005) utilize House's model determine how pro-women states affect individual pro-women behavior. Similarly, in this section, I present studies that detail how government actions affect environmental behavior at the individual level. For example, Kempton, Darley, and Stern (1992) explore how the functioning of the free market and government regulations may affect individual environmental behavior. The authors focus upon the US energy crisis of 1970 and illustrate how prices and government actions influence individual energy use. Kempton and his colleagues find that rising costs compel individuals to cut back on their energy use, including gasoline consumption. Stating that the free market would "provide the most efficient allocation of energy" (1219), the US government provided no incentives or regulations to promote energy efficiency during the 1970 crisis.

However, Kempton and his colleagues argue that government decisions fundamentally affect individual behavior. For example, government subsidies for oil companies provide lower gas prices for consumers, promoting the continued usage of fossil fuels and slowing the free market effects of rising oil costs (Rosenbaum 2005). Similarly, government imposed Corporate Average Fuel Economy legislation, commonly referred to as CAFE standards, will require all car manufacturers to comply with auto

emission standards by Model Year 2011 (US EPA 2007). Due to these future regulations, individuals in 2011 will not be able to purchase the inefficient cars currently on the market. These examples show how government decisions affect an individual's available choices; thus, a government's (in)actions affect an individual's ability and opportunity to engage in specific behaviors (Olander and Thorgeresen 1995).

Similarly, Dietz, Stern and Guagnano (1998) find that individual concerns about economic and environmental trade-offs predict four of their five behaviors (willingness to sacrifice for the environment, petition signing, belonging to an environmental group, and support of government environmental spending). Additionally, they analyze how micro-level factors such as gender, race, and age as well as meso-level factors such as education and religious denomination affect individual behavior. The authors conclude that contextual effects (macro and meso) in addition to individual, micro-level variables add robustness to environmental behavior studies.

De Almeida, Machado, and Da Costa (2006) conduct a cross-national study in Europe which compares the effect of class position with individual voting behavior. In their meso-level analysis, they divide respondents into five employment categories: industrial workers, routine employees, self-employed, professionals and managers, and entrepreneurs and executives. De Almeida, Machado, and De Costa conclude that individuals within each category hold similar ideological and political concerns and, consequently, display similar electoral practices.

Hays (1992) also analyzes environmental voting behavior. Using Congressional records and environmental voting scores created by the League of Conservation voters, Hays identifies legislators with the highest scores and compares them with the strength of

his/her district's "environmental culture." Hays finds that environmental voting scores positively relate to the strength of a region's "environmental culture." In other words, as a region's meso-level factors, e.g. education, media, and business, increasingly emphasize environmental quality, behaviors such as legislative voting in favor of the environment also increase.

Macro-level urban policies also affect individual transportation behavior (Marshall 2000). In the Netherlands, policies exist that regulate the number of cars in certain areas and designate specific times during which no cars are permitted. Policies such as these have decreased car trips and increased the use of bicycles. Also, the layout and design of cities, including walking zones built to ensure pedestrian shelter and security, affect individual transportation behaviors.

Similarly, Berger (1997) finds that availability and access to a recycling program "mediates the relationship between socioeconomic factors and recycling practice" (515). When access to recycling is equal, the influence of socioeconomic status on recycling behavior is significantly reduced. Berger shows that the majority of individuals recycle if convenient recycling programs are present. This study also indicates that individuals who recycle are also more likely to engage in other pro-environmental activities, such as using fluorescent lights and lowering the thermostat.

Berger concludes that recycling behavior does not predict individual use of public transit. However, the environmental behaviors that can be predicted from an individual's recycling behavior include energy conservation, lawn care, and water conservation. I argue that these behaviors, which all occur in the home, are less affected by policy. Further, individual use of public transportation, just as recycling usage, is more



dependent upon external factors than conditions in the home. For example, Kitamura, Mokhtarian, and Laidet (1997) find that public transit accessibility and the presence of sidewalks are significantly associated with mode of trip generation. Thus, it may be beneficial to examine individual transportation behavior in conjunction with transport policy and institutional structure.

These studies indicate that macro-level factors such as government regulations, meso-level factors such as income level, and micro-level factors such as age affect an individual's behavior. In the next section, I discuss several studies which utilize the similar variables to predict individual's environmental concern (Buttell 1979; Van Liere and Dunlap 1980; Jones and Dunlap 1992; Mohai 1992; Stern, Dietz, and Kalof 1993; Kanagy, Humphrey, and Firebaugh 1994; Davidson and Freudenburg 1996; Blocker and Eckberg 1997; Klineberg, McKeever, and Rothenbach 1998; Fortmann and Kusel 1999; Raudsepp 2001; Talley 2001; and Shanahan 2004).

### *Effects on Environmental Concern*

Dunlap and Jones (2002, 485) define environmental concern as “the degree to which people are aware of problems regarding the environment and support efforts to solve them and/or indicate a willingness to contribute personally to their solutions.” Though this definition does not explicitly connect environmental concern to environmental behavior, I argue the phrases “support efforts” and “willingness to contribute personally” relate to actual behavior. Further, the literature addressing the connection between individual concerns and behaviors is extensive. Perhaps the most

readily identified scholars in this field are Fishbein and Ajzen (1975), whose attitude-behavior model is utilized in countless studies. As I allude to in the introduction, Fishbein and Ajzen assert that many factors affect an individual's decision to engage in a specific behavior; concern alone does not predict behavior.

However, Fishbein and Ajzen also state that an individual's concern about a specific behavior (in contrast to a general behavior) may better predict the likelihood of the individual engaging in that specific behavior. For example, predicting an individual's car driving behavior, i.e. driving frequency, would be better inferred by a respondent's concern towards the danger of car-related air pollution than the respondent's general concern about the environment. Since concern may add explanatory power to my study, my literature review includes studies that examine the effects of macro-, meso-, and micro-level variables on individual environmental concern. In the next few paragraphs, I present studies that link factors such as religiosity, gender, race, and age to environmental concern.

Several researchers examine the effect of the meso-level effect of religiosity on individual's environmental concern. Raudsepp (2001) finds that religiosity positively correlates with both ecological activity and environmental concern. Contrastingly, Shanahan (2004) indicates that increased religiosity leads to decreased environmental concern. Further, Klineberg, McKeever, and Rothenbach (1998) found that religiosity does not predict environmental concern. Given the uncertainty about the effects of religiosity on environmental concerns and behaviors, it may be worthwhile to consider in this study.

Also, micro-level factors such as age and gender repeatedly show an affect on environmental concern (Buttell 1979; Van Liere and Dunlap 1980; Jones and Dunlap 1992; Mohai 1992; Kanagy, Humphrey, and Firebaugh 1994; Stern, Dietz, and Guagnano 1995; Dietz, Stern and Guagnano 1998; Wernet, Elman, and Pendleton 2005; De Almeida, Machado, and Da Costa 2006). Van Liere and Dunlap (1980) show that as age increases, environmental concern decreases. Kanagy and his colleagues find that respondents in younger age cohorts differed in their support for environmental spending; however, the results are not overwhelming. Similarly, Van Liere and Dunlap (1980) conclude that the majority of studies indicate a reverse relationship between age and environmental concern, though some research suggests the opposite. With this in mind, I include age in my analysis of car driving behavior.

Additionally, studies by Fortmanm and Kusel (1999), Davidson and Freudenburg (1996), and Blocker and Eckberg (1997) successfully link gender to environmental concern, though some studies have produced mixed results (Mohai 1992; Stern, Dietz, and Kalof 1993; Dietz, Stern and Guagnano 1998). In his summary of gender and environmental concern studies, Talley (2001, 21) asserts that overall, women seem “somewhat” more concerned than men. However, stand-alone variables, such as race and gender, should be treated with caution, since outside factors may influence the results.

In sum, social factors affect individual’s environmental *concern*. Studies also show that macro-, meso-, or micro- factors also affect an individual’s environmental *behavior*. Researchers have explored how these three levels of social factors affect individuals; however, only a handful of studies examine how the reduction of individual car driving is influenced by macro-, meso-, and micro-level indicators (Dobson, Dunbar,

and Smith 1978; Engel and Potschke 1998). My study explores how macro-level factors, such as environmental policy at the national level, affect individual's driving frequency. It is my hope that this study will extend the understanding of the interaction between policy and individual car driving behavior, within both the European Union and the United States.

### **Chapter III: Research Strategy**

This research follows the analytical model of Wernet, Elman, and Pendleton (2005) who use data from the World Values Survey to explore how macro-social structure affects individual behaviors relating to gender ideology and postmodernism. Wernet and her colleagues frame their study using House's (1981) three principles of social structure: components principle, proximity principle, and psychological principle, which relate, respectively to macro-, meso-, and micro-level structures. I apply Wernet, Elman, and Pendleton's analytical approach and integrate House's (1981) conceptual model to determine how environmental policy climate (represented within my macro-level variables, i.e. policy, government participation in international efforts, and subsidies for energy) affect individual car driving behavior.

#### *Sample*

My analysis is based on a selection of 17 nations' sample surveys from the International Social Survey Program: Environment II, 2000 (ISSP) which is provided by the Interuniversity Consortium for Political and Social Research. Researchers collected data between January 2000 and April 2002, with some date variations by country (International Social Survey Program, see Appendix 3 for more detail). Although data was collected from respondents in 27 countries, I limit<sup>2</sup> my analysis to European Union (EU) countries for two reasons. First, all EU members are legally bound to the European Commission's (EC) environmental regulations. Second, unlike the United States,

---

<sup>2</sup> For further explanation, see limitations section.

European infrastructure favors alternative transport modes, such as walking and biking, as opposed to driving (Schwanen 2001).

The sampling frame within the ISSP varied by country (Appendix 1). Data was collected from face-to-face interviews in all countries with the exception Denmark, Finland, the Netherlands, and Sweden, whose researchers utilized a self-completion postal survey. Also, respondents in Great Britain and East and West Germany completed questionnaires and answered background questions in face-to-face interviews. Because of macro-level predictor limitations, I merged data from West and East Germany (collected separately) to comprise the “Germany” subset. Also, I merged Great Britain and Northern Ireland to comprise the “United Kingdom” subset. As the dependent variable for this study is related to reductions in car driving, I limited my analysis by deleting respondents who indicated that they do not have or cannot drive a car. I also deleted two respondents from Finland who did not answer the gender question. With these deletions, my sample consists of 13,389 cases from 15 states.

### *Data*

The ISSP module used in this study addresses many environmental issues including behaviors relating to ecological threats. Respondents were queried about their recycling and car driving behaviors, their willingness to pay higher prices to protect the environment, and their concerns about the greenhouse effect and air pollution. In addition to environmental behaviors, intentions, and concerns, researchers collected demographic information about each respondent.

Of specific interest to this study, respondents were asked how often does s/he cut back on driving a car for environmental reasons, with available choices measured on a Likert-type scale ranging from “always” to “never.” Further, data addressing micro-level factors, such as respondents’ concerns, were measured. For example, respondents were asked to assess how dangerous car-related air pollution is for the environment. In a separate question, respondents assessed how dangerous car-related air pollution is for the respondent and his/her family. The survey also measured respondent age, gender, and union (marriage or cohabitation) status.

Meso-level factors such as family income, employment type, education, urbanicity, and religiosity were also included in the survey. As is the case with most datasets, the ISSP had missing data on most of the variables. For the micro-level predictors, the number of missing cases is trivial (less than 5%); however, there is a sizeable number of missing cases for the meso-level predictors. Education is missing 12.0%; urbanicity - 16.8%; religiosity -14.4%; family income - 20.0%; and job type - 21.3%. Excluding cases with listwise deletion would eliminate as much as 40% of the sample.

Since data do not appear to be missing completely at random, listwise deletion would also result in selectivity. To remedy this problem, I imputed missing data using the chained equation multiple imputation algorithm (ice) in STATA. For missing information, the “ice” procedure generates and imputes a new value by regressing each variable with missing data on all observed variables (except the dependent) and adding random error to the imputed values in order to preserve observed variability.

Data from the 2001 and 2002 Environmental Sustainability Indexes (ESIs) provide the three macro-level predictors of this study. Drawing upon the macro-level variables used by Kempton, Darley, and Stern (1992), Olander and Thorgeresen (1995), and Engel and Potschke (1998) to predict individual environmental behavior, I select ESI scores which measure national subsidies for energy use, national participation in global environmental efforts, and national environmental policies. Both the measures of national government subsidies for energy and material usage and government participation are taken from the 2002 ESI Index; within my study, these two variables are labeled “Subsidies” and “Participation in International Cooperative Efforts,” respectively. The data measuring national environmental policy are drawn from the 2001 ESI Index, and is labeled “Regulation and Management.” Individuals from each individual country receive identical scores for all three macro-level indicators.

### *The Dependent Variable*

The variable of interest in my study is car driving behavior. Respondents are asked, “How often do you cut back on driving a car for environmental reasons?” I analyze respondents who select one of four choices: always, often, sometimes, and never (deleting respondents who indicate “I do not have or cannot drive a car”). I recode this question to correspond higher values with a higher occurrence of decreased car driving: “always” = 4; “often” = 3; “sometimes” = 2; and “never” = 1 (Table 1).<sup>3</sup>

---

<sup>3</sup> For example, if the respondent selects “always,” the response reads, “I *always* cut back on car driving for environmental reasons.”



Table 1. Dependent Variable Measurement Code Type

Variable	Level of Measurement	Description of variable
reduce car driving	ordinal	"How often do you cut back on driving a car for environmental reasons?" 1=never (reference) 2=sometimes 3=often 4=always

### *The Micro-Level Variables*

The micro-level variables include age, sex, union status, concern about air pollution danger to family, and concern about car-related air pollution danger to the environment. Numerous studies have shown that age affects environmental behavior (Buttelt 1979; Van Liere and Dunlap 1980; Jones and Dunlap 1992; Kanagy, Humphrey and Firebaugh 1994; Dietz, Stern and Guagnano 1998). The eight ISSP age categories are recoded into six age categories (Table 2). Because only 54 respondents are less than 18 years, I group them with respondents 18-24 years. Similarly, only 354 respondents are aged 75 or older. These data are recoded into the 65-74 years category.

Gender is recoded 0 for females and 1 for males. The gender distribution is nearly equivalent, with females comprising 49.91% (6682) and males accounting for 50.09% (6707) of the sample. I also control for union/marriage status. The ISSP survey includes five categories: married/living as married, widowed, divorced, separated, and never married. Instead, I create a dichotomous variable: married/living as married = 1 and respondents in the categories widowed, divorced, separated, and never married = 0. Environmental concerns have been loosely linked to environmental behaviors (Gill, Crosby, and Taylor 1986). In their theory of reasoned action, Fishbein and Ajzen (1975)

Table 2. Micro-Level Variables Measurement and Code Type

Variable	Level of Measurement	Description of Variable
union status	dichotomous	1=living with spouse or partner; 0=not living with a spouse or partner
age	interval	Categories of age (1,6)
gender	dichotomous	1=male; 0=female
pollution threat to family	categorical	"Do you think that air pollution caused by cars is: 1= Not dangerous at all for you and your family; 2= Not very dangerous; 3=Somewhat dangerous; 4= Very dangerous; 5= Extremely dangerous for you and your family (reference)
pollution threat to environment	categorical	"Do you think that air pollution caused by cars is: 1= Not dangerous at all for the environment; 2= Not very dangerous; 3=Somewhat dangerous; 4= Very dangerous; 5= Extremely dangerous for the environment (reference)

state that concerns affect behaviors indirectly through behavioral intentions.

Additionally, a specific behavior can be better predicted by the concern towards that specific behavior. Though I do not focus on Fishbein and Ajzen's concern-behavior micro-process, I utilize their theory to construct a model that connects a closely related concern and behavior. I posit that the measure of the respondent's concern toward car-related air pollution will provide additional, though perhaps limited, explanatory power for the respondent's car driving behavior.

Concerns related to car-related air pollution were measured by two questions: one measuring respondents' concern about the danger of car air pollution to the environment and the second measuring the danger for themselves and their families (Table 2).<sup>4</sup> The

<sup>4</sup> The first question asks the respondent about the danger to the environment: "In general, do you think that air pollution caused by cars is: 1) Extremely dangerous for the environment; 2) Very dangerous; 3) Somewhat dangerous; 4) Not very dangerous; 5) Not dangerous at all for the environment?" The second

number of respondents selecting “Not dangerous at all” in both questions is low (68 for environment; 253 for family) and I combine them with respondents selecting “Not very dangerous.” Further, both questions are recoded so the higher number indicates a higher perception of danger: 1) Not very dangerous or not dangerous at all for the environment/family; 2) Somewhat dangerous; 3) Very dangerous; 4) Extremely dangerous for the environment/family. The fourth category, “extremely dangerous,” serves as the reference category for analysis.

### *The Meso-Level Variables*

I hypothesize that educational attainment, job type, family income, urbanicity, and religiosity affect environmental behavior. The International Social Survey Program contains questions that measure each of these meso-level variables. Respondents’ educational attainment is represented by number of years in school, which range from 3-25 years (Table 3).

With regards to job type, respondents were asked to select their present or last occupation. Using the ILO/ISCO International Labor Office/International Standardized Classification of Occupation (ILO/ISCO) International Code 1988, respondents selected from a list of over 500 occupations that the ISSP classifies into ten categories.<sup>5</sup>

---

asks about the danger for themselves and their families: “In general, do you think that air pollution caused by cars is: 1) Extremely dangerous for you and your family; 2) Very dangerous; 3) Somewhat dangerous; 4) Not very dangerous; 5) Not dangerous at all for you and your family?”

<sup>5</sup> Ten categories include: Armed forces; Legislators, senior officials, and managers; Professionals; Technicians and associate professionals; Clerks; Service workers and shop and market sales workers; Skilled agricultural and fishery workers; Craft and related trade workers; Plant and machine operators and assemblers; and Elementary occupations. For a complete list of occupations refer to ILO/ISCO 1998 International Standard Classification of Occupations: International Labor Office, Geneva 1991.

Table 3. Meso-Level Variables Measurement and Code Type

Variable	Level of Measurement	Description of variable
educational attainment	interval	Number of years of school attended (3-25)
job type	categorical	never worked (reference), agriculture, manual, technical/office, professional
family income	dichotomous	1=at or above average income of respondents from that country; 0=below average
urbanicity	dichotomous	1=live in big city; 0=live in suburb or rural area
religiosity	interval	Frequency of religious service attendance (1-6)

Following the work of Kohn (1977), Inkeles and Smith (1975), and Wernet, Elman, and Pendleton (2005), I drop respondents in the armed forces occupation, as they comprise less than 0.4% of the sample and arguably have less discretion over their car-driving behavior. Also reflecting the research of Kohn 1977; Inkeles and Smith 1975; and Wernet, Elman, and Pendleton 2005, I recode the ten occupational categories into five: 5) *professionals*; 4) *technical/office workers*; 3) *manual workers*; 2) *elementary workers*; and 1) *not working*.

The *professionals* category is comprised of respondents who select an occupation which is classified within the ILO/ISCO “legislators, senior officials, and managers” or “professionals” categories. Respondents whose occupation is grouped within the “technicians and associate professionals” and “clerks” categories comprise my *technical/office workers* group. The third category, *manual workers*, is composed of respondents with occupations belonging within the “service workers and shop and market sales workers,” “craft and related trade workers,” and “plant and machine operators and assemblers” categories. Occupations classified as “skilled agricultural and fishery workers” and “elementary occupations” comprise my *elementary workers* category. Respondents who did not indicate either full-time or part-time employment status are

classified into the *never worked* category. Also, respondents from Norway and Hungary use unique codes for certain occupations; however, I recode each into one of the five categories (for more information see Appendix 3).

Religiosity is measured by the respondents' religious service attendance frequency. The respondent is given the choice between six categories, ranging from attending service once a week or more to never attending. I recode the variables to correspond higher value with higher attendance frequency. For example, attending once a week or more is recoded as 6; respondents attending two to three times a month are recoded 5; those who attend about once a month are recoded as 4; respondents attending services several times a year are recoded as 3; respondents attending less frequently are recoded as a 2; and those who indicate that they "never" attend religious services are recoded as 1.

Next, the urbanicity measure is based upon the respondent's answer to "describe the place where you live." Choices include: 1) a big city; 2) the suburbs or outskirts of a big city; 3) a small city or town; 4) a country village; and 5) a farm or home in the country. I recode respondents into two categories: a big city (1) or all other (0). Individuals living in a city are likely to have greater more transportation options for meeting daily needs, e.g. walking, buses, taxis, decreasing their need for private transportation (Marshall 2000). By contrast, respondents living outside the city center may have an increased necessity for a car, since they are presumably farther from work, grocery stores, and public transportation.

The last meso-level predictor is family income. Since respondent family income level is reported in the currency of individual nations, which makes direct comparisons

difficult, I calculate the national average family income separately for each nation.

Respondents reporting family income at or above the national average for their country of residence are recoded as 1 and those reporting below the national average for that country are recoded as 0. I argue that this method is preferable to converting income into standard units, such as constant US dollars, since US\$35,000 in Italy has considerably more buying power than it does in the United Kingdom. By creating a dummy variable for income, some of the nuances of income differences are lost, but a more meaningful comparative measure is created.

### *The Macro-Level Variables*

Macro-level data relating to country level environmental policies are not available in the ISSP data set. Instead, I access data from the 2001 and 2002 Environmental Sustainability Indexes (ESI). The ESI, published annually since 2000 by the World Economic Forum, is a “measure of overall progress towards environmental sustainability” which is based upon 22 (2001) and 20 (2002) core indicators, “each of which combines two to seven variables for a total” of 67 (2001) and 68 (2002) underlying variables. The ESI score is based upon a large range of factors, including measures of population growth, basic human sustenance, and environmental health which are combined to create a single score for each nation; however, the primary focus of my study is to identify how policy affects car driving behavior. Therefore, instead of using the ESI score composed of all underlying variables, I isolate the indicators and variables that deal directly with environmental policy to represent my macro-level measures.

I select two of the 22 ESI indicators (Regulation and Management; Participation in International Cooperative Efforts) and one variable (Subsidies for Energy and Materials Use) from the 67 underlying variables to represent my three macro-level predictors (World Economic Forum 2001a; World Economic Forum 2001b; World Economic Forum 2002). From the 2001 ESI, the Regulation and Management indicator is composed of four variables: stringency and consistency of environmental regulations, degree to which environmental regulations promote innovation, percentage of land area under protected status, and number of sectoral environmental impact assessment guidelines. Data for these variables were collected between the years 1997-2000 (Table 4). Scores for nations ranged from -0.71 (Bulgaria) to 1.54 (Denmark and the United Kingdom).

Second, the Participation in International Cooperative Efforts indicator is based on seven underlying variables: the number of memberships in environmental intergovernmental organizations; percentage of Convention on International Trade in Endangered Species (CITES) reporting requirements met; levels of participation in the Vienna Convention and the Montreal Protocol on Ozone Depleting Substances; level of participation in the Climate Change Convention; Montreal Protocol Multilateral Fund Participation; Global Environmental Facility Participation; and compliance with international agreements. Data for these variables were collected between the years 1998-2001. National scores ranged from -0.39 (Slovenia) to 1.27 (Germany).

Also from the 2002 ESI, my third macro-level variable measures national subsidies for energy and material usage. Generated by the Global Competitiveness Report, respondents are asked to respond to the statement “No government subsidies for

energy or materials usage are present” (The World Economic Forum 2001). The responses range from 1 (Strongly Disagree) to 7 (Strongly Agree), with the logic being that the more agreement, the less subsidies are present that encourage wasteful energy consumption (Table 5). These scores ranged from 4.29 (Latvia) to 5.94 (Finland).



Table 4. Macro-Level Variables Measurement and Code Type

Variable	Level of Measurement	Description of variable
Regulation and Management ESI Indicator	scale	Four Underlying Variables 1) stringency and consistency of environmental regulations; 2) degree to which environmental regulations promote innovation; 3) percentage of land area under protected status; and 4) number of sectoral environmental impact assessment guidelines
Participation in International Efforts ESI Indicator	scale	Seven Underlying Variables: 1) number of memberships in environmental intergovernmental organizations; 2) percentage of Convention on International Trade in Endangered Species (CITES) reporting requirements met; 3) levels of participation in the Vienna Convention and the Montreal Protocol on Ozone Depleting Substances; 4) level of participation in the Climate Change Convention; 5) Montreal Protocol Multilateral Fund Participation; 6) Global Environmental Facility Participation; and 7) compliance with international agreements
Subsidies for Energy and Material Usage	scale	Response to "No government subsidies for energy or materials usage are present." Range from 1 (Strongly Disagree) to 7 (Strongly Agree)

Table 5. Environmental Sustainability Index Scores (Macro-level indicators) for Each Nation

Country	Regulation and Management	International Cooperation in Global Efforts	Subsidies for Energy and Materials Use
Austria	1.26	1.00	5.56
Bulgaria	-0.71	0.73	4.31
Czech Republic	0.17	0.57	4.35
Denmark	1.54	1.04	4.96
Finland	1.21	1.12	5.94
Germany (East and West)	1.34	1.27	5.28
United Kingdom (Great Britain and Northern Ireland)	1.54	1.07	4.94
Ireland	0.07	0.22	4.60
Latvia	-0.04	0.09	4.29
Netherlands	0.75	1.17	5.50
Norway	0.42	1.00	4.55
Portugal	0.35	0.24	4.37
Slovenia	-0.50	-0.39	4.49
Spain	0.43	0.98	4.74
Sweden	0.84	1.15	5.38
Mean	0.58	0.75	4.89
Median	0.43	1.00	4.74

## *Hypotheses*

By identifying how the macro-, meso-, and micro-factors affect individual driving behavior, I hope to contribute to the improvement of environmental policy in the European Union and United States. With more effective policies, perhaps a decrease in environmentally harmful behaviors, such as car driving, will occur and the human contribution to global climate change will decrease.

Repeatedly, studies show that institutional factors affect individual behavior (Kempton, Darley, and Stern 1992; Olander and Thorgersen 1995; Rosenbaum 2005). With this in mind, I hypothesize that:

*H1: Residents of countries with higher Environmental Sustainability Index scores will more likely reduce their automobile use to reduce global climate change.*

In addition, Kohn and Slomeczynski (1990), Hays (1992), Engel and Potschke (1998), Klineberg, McKeever, and Rothenbach (1998), Raudsepp (2001), Feldman and Moseley (2003), and Shanahan (2004) indicate that differences in meso-level variables such as education and income influence the likelihood of individuals expressing pro-environmental behaviors, leading me to my second and third hypotheses:

*H2: Residents with higher levels of education will more likely reduce their automobile use to reduce global climate change.*

*H3: Residents with higher family income will more likely reduce their automobile use to reduce global climate change.*

Past studies show environmental behaviors are affected by the respondent's age (Buttell 1979; Van Liere and Dunlap 1980; Jones and Dunlap 1992; Kanagy, Humphrey and Firebaugh 1994) and gender (Fortmann and Kusel 1999; Davidson and Freudenburg 1996; and Blocker and Eckberg 1997):

*H4: Younger residents will more likely reduce their automobile use to reduce global climate change.*

*H5: Female residents will more likely reduce their automobile use to reduce global climate change.*

#### *Limitations/Delimitations*

As with any study, it is impossible to identify all factors affecting a certain outcome. Using data collected through the General Social Survey, I can determine how several macro-, meso-, and micro-level factors affect individual car driving behavior. Using House's conceptual model, Wernet and her colleagues 2005 assert that postmodern concern (micro-level) can predict an individual's post-modern behavior. In contrast, Fishbein and Ajzen (1975) assert that the transition from concern to behavior is mediated by an individual's behavioral intentions. The goals of my thesis are not affected by this discrepancy. The purpose of my thesis is to identify macro-level factors that affect an individual's behavior. Thus, my study does not focus upon Fishbein and Ajzen's micro-process which relates concern to behavior. Instead, I center upon how individual behaviors are affected by macro-level variables, independently and aggregately in combination with meso- and micro-level variables, such as concern.

Though the majority of the American public is supportive of US participation in the Kyoto Protocol (Program on International Attitudes 2005), US leaders consistently lag behind in concrete efforts to reduce emissions (Sbragia and Damro 1999; Vogel 2003; and Zito 2005). Further, the transportation infrastructure of the United States heavily favors the single-car driver (Wilkenson 1997; Pucher and Renne 2003; Bohon, Stamps, and Atilas 2008). The majority of Americans must use a car to obtain their basic needs (Marshall 2000). Due to travel infrastructure constraints, I exclude US respondents from my analysis. In addition, since the primary goal of this study is to identify policies that affect individual car driving behavior, I exclude respondents who indicate “I do not have or cannot drive a car.”

This study is restricted to nations that were European Union members as of June 2007. At the time this data was collected between 2000 and 2002, fifteen nations were EU members; however, the primary study did not collect data from five of these nations (Belgium, Denmark, France, Greece, and Luxembourg). In 2004, the European Union added ten additional countries; however, the primary study did not collect data from six of these accession states (Slovakia, Malta, Lithuania, Poland, Estonia and Cyprus). In 2007, Bulgaria and Romania joined the European Union; however, the primary researchers did not collect data from Romania.

By including only members of the EU,<sup>6</sup> I can focus upon only the countries which the European Environmental Community (EC) can bring before the European Court of Justice (ECJ) for violating environmental laws (Macrory 2006). More importantly, the infrastructure of European countries, including accession states, supports

---

<sup>6</sup> Countries excluded: Australia, Northern Ireland, New Zealand, Canada, Philippines, Israel, Japan, Republic of Chile, and Switzerland.

more sustainable transportation behaviors, such as public transit, walking, and biking (Marshall 2000). Additionally, European Union nations are often ranked at the forefront of climate change policy, especially since 2001, when all 2001 EU member states ratified the Kyoto Protocol (Streck and Freestone 2006). A handful of EU countries have even set emission regulations stricter than those required in the Kyoto Protocol (Lieberink and Anderson 1998).

Though EU accession states are not legally bound to EU regulations until their official membership, “pre-accession” strategies are implemented in each candidate nation. These strategies promote investment in environment, transportation infrastructure, and agricultural modernization and align laws and systems with those of the EU (Government of Ireland 2004). Therefore, I feel it is valuable to include the 2004 and 2007 accession states in my analysis.

In total, my study will include 10 original EU states, four 2004 accession states, and one 2007 accession state. Within the ISSP data, respondents from East and West Germany are denoted separately; similarly, respondents from Great Britain and Northern Ireland occupy distinct values in ISSP dataset. However, the European Union unifies East and West Germany as “Germany,” and Great Britain and Northern Ireland as the “United Kingdom.” Likewise, the Environmental Sustainability Indexes utilizes the same classification as the European Union. Thus, though respondents are denoted separated within the ISSP data, I group respondents according to the EU and ESI classification (Table 5).

Therefore, I will analyze 15 separate states: Austria, Finland, Germany (comprised of respondents from East and West Germany), the United Kingdom

(comprised of respondents from Great Britain and Northern Ireland), Ireland, Denmark, the Netherlands, Portugal, Spain, and Sweden and Czech Republic, Hungary, Latvia, and Slovenia and Bulgaria.

### *Assumptions*

Though countries of the European Union are legally bound to EU directives, the leaders of each nation decide how to implement these directives in their countries (Sabatier 1998). Further, within each individual country, environmental administrative power is divided amongst EU officials, national leaders, and private enterprise in various allocations (Winter 2006). For example, national leaders and private enterprise may accredit or supervise environmental tasks, such as the classification of dangerous substances. In theory, the European Commission holds the power to discredit these actions if they contradict EU environmental directives. Also, all candidate states must develop comprehensive plans detailing legislative, financial, and technological efforts to align EC environmental law. Thus, as all residents of the European Union, regardless of nationality, are ultimately bound to the same EU environmental standards, I assume that

*A1: Residents of EU countries have equal latitude to reduce car-driving behavior.*

The member nations of the European Union have unique cultures. However, studies indicate that meso-level predictors, such as education, religiosity, income, and type of employment can be comparable across national boundaries in the European Union. In their study of environmental policy in the European Union, Heritier, Knill, and

Mingers (1996) find that “formal coordination patterns develop [in EU member states] – embedded in the institutional structures of Europe – the produce specific policy contents and require member states to undertake specific adjustments in their policy practices” (332). For example, the European Union is making educational policies and practices more consistent within member states. Adams (2006) and Daun and Siminou (2006) state that most European nations have similar educational policies. Wielemens (2000, 32) assert individual EU-nations educational policy “is increasing confronted with international pressures and forces which tend to promote uniformity...”

Though comparative, cross-national research on the affects of income, job type, religiosity, urbanicity, and education on environmental behavior in EU nations is lacking and often inconclusive, I will assume that these variables behave similarly in each EU nation.

*A2: The effects of income, job type, religiosity, urbanicity, and education on the reduction of car driving is similar within individual EU nations.*

Further, I classify marital status as a micro-level variable; however, because marriage can be considered a social institution, it could also be designated as a socialization or meso-level variable. Within my study, I group marital status in the category with age, gender, sex, and concern.

Though the nature of this study is exploratory, I feel the findings can contribute to the environmental behavior literature. To this end, Kohn (1989) states, “although the discovery of cross-national differences may initially require that we make a less sweeping interpretation, in time and with thought it can lead to more general and more powerful



interpretations” (85-86). I hope to identify several institutional, socialization, and individual factors that affect the reduction of car driving within EU nations. It is my hope that this research contributes to an increase in successful environmental policy at the international, national, and state levels.

## **Chapter IV: Results**

Descriptive statistics are presented in Table 6. They show that over eighteen percent of the sample often or always reduce car driving to help the environment. On average, respondent education level is approximately twelve years. Only 14.64 percent of the sample lives in a big city, with the majority of respondents living in a suburb or rural area. Further, the mean religiosity measures 2.71, indicating that most of the sample attends religious services a few times a year or less. Over 44.33% of the sample has a family income equal to or greater than the average income of the sample population from the respondent's country. The majority of respondents (65.49%) are either married or living as married. Last, the mean value for the age category is 3.50, indicating that the majority of respondents are between 35-54 years of age.

To test how policy affects individual car driving behavior, I run four ordered logit models. The first model tests the aggregate effect of my three macro-level predictors: Regulation and Management, Participation in International Cooperative Efforts, and Subsidies for Energy and Materials Use (Table 7). In the second model, I test how driving behavior is affected by meso-level variables, i.e. education level, urbanicity, religiosity, family income, and job type. The aggregate effect of union status, sex, age, and concerns about the danger of air pollution to the environment and self/family comprise the micro-level variables in Model 3. Last, in Model 4, I regress the macro-, meso-, and micro-level variables on individual driving behavior (Table 7). In all models, odds ratios and p-values are shown. For resultant regression coefficients and standard error refer to Appendix 4.

Table 6. Descriptive Statistics, Percent or Mean with Standard Deviation

Dependent variable:	Percent or Mean (SD)
<i>Reduced car driving to help environment</i>	
Never	46.59
Sometimes	35.28
Often	15.09
Always	3.05
Macro-level predictors:	
Regulation and management	0.70 (.65)
International cooperation	0.82 (.47)
Energy and material use subsidies	4.97 (.51)
Meso-level predictors:	
Education	12.00 (3.50)
Lives in big city	14.64
Religiosity	2.71 (1.63)
At or above average income for country	44.34
<i>Job type</i>	
No job	40.08 (0.49)
Elementary position (includes agriculture)	4.90 (0.22)
Manual labor	20.50 (0.40)
Technical or office	16.16 (0.37)
Professional	15.32 (0.36)
Micro-level predictors:	
Married or in union	65.49 (0.48)
Male	50.10
Age	3.50 (1.50)
<i>Perceived level of danger of cars to environment</i>	
Not at all or not very	8.46 (0.28)
Somewhat	42.83 (0.94)
Very	35.41 (0.48)
Extreme	13.29 (0.34)
<i>Perceived level of danger of cars to family and self</i>	
Not at all or not very	20.74 (0.41)
Somewhat	45.81 (0.50)
Very	23.89 (0.43)
Extreme	9.56 (0.29)
N	13,389

Table 7. Ordered logit effects of macro-, meso-, and micro-level predictors on reducing car driving (odds ratios shown)

	Model 1	Model 2	Model 3	Model 4
Regulation & management	1.20***			1.15**
International cooperation	1.35***			1.33***
Subsidies	1.39***			1.74***
Education		1.00		1.02***
Lives in big city		.95		1.06
Religiosity		.98*		0.99
At or above average income		.87***		0.90**
<i>Job type:</i>				
None		Reference		Reference
Elementary		.72***		0.87
Manual		.65***		0.82***
Technical		.84***		0.88*
Professional		.81***		.85**
Married or in union			.87***	.95
Male			.81***	.84***
Age			1.17***	1.13***
<i>Danger to environment:</i>				
None or little			.57***	.55***
Somewhat			.77***	.74***
Very			.94	.93
Extreme			Reference	Reference
<i>Danger to family:</i>				
None or little			.73***	.50***
Somewhat			.96	.77**
Very			.98	.89
Extreme			Reference	Reference
N	13389	13389	13389	13389
Likelihood ratio $\chi^2$	532.80***	141.05***	427.56***	1172.26***
Pseudo R <sup>2</sup>	0.02	0.00	0.01	0.04
*p < 0.05 **p < 0.01 ***p < 0.001				

For Models 1, 2, 3, and 4, the pseudo- $R^2$  values are 0.02, 0.00, 0.01, and 0.04, respectively. A pseudo- $R^2$  value can range from 0 to 1: zero indicating the higher likelihood of external variables influencing the dependent and one indicating a lower likelihood of external variables interacting with the dependent variable. Though each model is significant ( $0 < 0.001$ ), because pseudo- $R^2$  values are so close to zero, variables external to this model are likely influencing the dependent variable – car driving.

The three macro-level predictors show a significant ( $p < 0.001$ ) positive correlation with the reduction of individual driving behavior. That is, as the national scores increase, the likelihood of an individual reducing his/her car driving increases. These results support my first hypothesis that nations with higher ESI scores will be more likely to reduce car driving for environmental reasons.

The odds ratio indicates the strength of each predictor on individual driving behavior (Table 7). The Regulation and Management predictor has an odds ratio of 1.20; for each point increase in the Regulation and Management score, the probability of an individual going up one point on the driving scale (the probability of driving less) increases by 20% ( $p < 0.001$ ). Similarly, the Participation in International Cooperative Efforts odds ratio is 1.35; as a nation's International Participation score increases by one point, the probability of an individual driving less increases by 35% ( $p < 0.001$ ). Of the three macro-level indicators, the measure of subsidies for energy and materials usage also shows a strong positive effect on individual driving behavior with an odds ratio of 1.39. With every point increase on the subsidy scale, the probability of an individual driving less increases by 39% ( $p < 0.001$ ).

The meso-level variables showed mixed results. The results show that education level does not significantly affect individual car driving reduction, contradicting my second hypothesis. Also, living in a big city, relative to living elsewhere, did not affect driving reduction. However, all other meso-level predictors show a significant relationship to car driving reduction. With an odds ratio of 0.98, an increase in religiosity represents a 2% decrease in the likelihood to reduce driving ( $p < 0.05$ ). This supports the findings by Shanahan (2004), who shows that higher religiosity relates to lower environmental concern. That is, individuals who attend religious services more often are less likely to reduce car driving for environmental reasons. Similarly, respondents who indicate that their family income is at or above the national average are 13% ( $p < 0.001$ ) less likely to reduce their car driving for environmental reasons. These results contradict my third hypothesis and the findings of Engel and Potschke (1998) who find that respondents with higher income levels are more likely to reduce their car driving; however, the discrepancy could be accounted for by different measurement techniques.

Respondent job type also significantly ( $p < 0.001$ ) affects individual reduction of car driving. With the reference category corresponding to respondents who indicate that they do not have a job, the four categories of job type (elementary, manual, technical/office, and professional) negatively relate with the reduction of car driving (Appendix 4). Individuals with elementary occupations are 28% ( $p < 0.001$ ) less likely than those without a job to decrease car driving. Similarly, manual workers are 35% ( $p < 0.001$ ) less likely to reduce car driving for environmental reasons; technical/office workers are 16% ( $p < 0.001$ ) less likely than respondents without a job to reduce car driving; and professional workers are 19% ( $p < 0.001$ ) less likely to reduce their car

driving than individuals who indicate that they do not have a job. This may indicate that those who work have less flexibility or perceive themselves to have less flexibility in changing their modes of transportation.

Micro-level effects are tested in Model 3. Union status and sex both show a significant ( $p < 0.001$ ) negative relationship with the reduction of car driving. That is, males are 19% less likely than females to reduce car driving, supporting my fifth hypothesis; individuals who are married or living as married are 13% less likely to reduce car driving than respondents who are not married or living as married. Age is also significantly related to car driving ( $p < 0.001$ ); however, the relationship is positive. As an individual moves up a point on the age scale, the likelihood of that individual moving up one point of the driving less scale (likelihood of driving less) increases by 17%, contradicting my fourth hypothesis. Again, the differences in my results and those found previously may be a factor of different ways of measuring age. It is unfortunate that ISSP data does not allow for the continuous measurement of age, which may result in more nuanced findings.

Concern about the danger of car-related air pollution for the environment and for the individual/family show mixed results. The reference for both variables is the “extremely dangerous for...” categories. Respondents indicating that air pollution poses little or no danger to the environment are 49% less likely to reduce car driving than respondents who indicate that air pollution is extremely dangerous for the environment ( $p < 0.001$ ). Similarly, individuals who believe that air pollution is somewhat dangerous for the environment are 23% less likely to reduce car driving than those who believe that air pollution is extremely dangerous for environment. Respondents indicating that air

pollution is very dangerous to the environment do not differ significantly from respondents in the extremely dangerous category.

In addition, in regards to the danger of air pollution to the individual and his/her family, only respondents indicating that air pollution poses little or no threat to the self and his/her family significantly ( $p < 0.001$ ) differ from the reference category.

Respondents who believe that air pollution poses little or no threat to self and family are 27% less likely to reduce car driving than respondents who believe it is extremely dangerous.

In Model 4, the combined effects of macro-, meso-, and micro-level predictors are tested. Both the Participation in International Cooperative Efforts and Subsidy variables retain a significant, positive relationship at the  $p < 0.001$ ; however, the Regulation and Management variable remains significant, but at the  $p < 0.01$  level. Also, the odds ratios change slightly. Both the Regulation/Management and International Cooperation indicators show less explanatory power than in Model 1, from 20 to 15% and 35 to 33%, respectively. However, the subsidies for energy use and materials indicators gains more predictive power, likely indicating an untested interaction with other variables (most likely concerns about the environment). In Model 1, as the subsidy score increases by a point, the probability of respondents moving up one point on the driving scale (decreasing driving) increases by 39 percent; however, with interaction effects, the probability of respondents driving less increases by 74 percent as the subsidy score increases. Thus, when considered with meso- and micro-level factors, the subsidy predictor explains more of the variance in car driving behavior, while the regulation and management and the international participation factors explain less.



Meso-level predictors also vary when considering interaction effects. Education, which showed no significant relationship with driving in Model 2, has a significant positive relationship in Model 4. Affirming my second hypothesis, as education level increases, respondents are 2% more likely to reduce car driving ( $p < 0.001$ ). As stated within the assumption, studies show that EU leaders are working to make education policy consistent within member states (Adams 2006; Daun and Siminou 2006). Further, and more importantly, in member states, “political institutional conditions” enable “political attention to be drawn to environmental interests” and facilitate “access to the political agenda” (Heriter, Knill, and Mingers 1996:23). In other words, state leaders may be more likely to inculcate the goals of the EU, including reducing greenhouse gas emissions, within the educational system. Individuals who complete higher levels of education have greater exposure to EU “agenda,” including reducing human contributions to climate change; these individuals may be more likely to engage in behaviors supported by institutional conditions.

Religiosity, which shows a weak relationship in Model 2, shows no significant relationship with driving in Model 4. Also, income level becomes less significant (from  $p < 0.001$  to  $p < 0.01$ ) and shows that respondents whose family income is at or above the national level are 10% less likely to reduce their car driving for environmental reasons. This result contradicts my third hypothesis that higher income is positively related with reduced car driving.

Only three (manual, technical, and professional) categories of job type significantly differ in Model 4, in contrast to Model 2, in which all four levels (including elementary jobs) are significant. Considering interaction effects, manual workers are

18% less likely than individuals without a job to reduce their car driving ( $p < 0.001$ ); technical workers are 12% less likely ( $p < 0.05$ ); and professionals are 15% less likely to reduce their car driving for environmental reasons ( $p < 0.01$ ).

When micro-level predictors are combined with the macro- and meso-factors, union status becomes insignificant, while age and gender remain significant ( $p < 0.001$ ). The age odds ratio decreases slightly from 1.17 to 1.13; however, the gender value increases from 0.81 to 0.84. The age variable indicates that as respondents get older, they are more likely to reduce car driving for environmental reasons. This result contradicts my fourth hypothesis, which states that as individuals get older, they will less likely to drive less; however, my fifth hypothesis is affirmed, as my results show the women are more likely than men to reduce car driving.

The predictor measuring respondent concern about danger to the environment also changes slightly, gaining more predictive power when accounting for other effects. With the “extreme danger” category as reference, the “no or little danger to the environment” odds ratio decreases from 0.57 to 0.55 ( $p < 0.001$ ) and the “somewhat dangerous to the environment category” decreases from 0.77 to 0.74 ( $p < 0.001$ ). Both categories remain negatively correlated with reducing car driving; that is, respondents indicating that air pollution poses no or little danger and somewhat dangerous to the environment are 45% and 26% respectively, less likely to reduce car driving than respondents who believe that air pollution is extremely dangerous for the environment. The “very dangerous” category remains insignificant.

In Model 4, respondent concerns about the dangerous of air pollution for the self and family also gain more predictive power. Again with the reference category being

“extremely dangerous,” the “no or little danger to self/family” category decreases from 0.73 to 0.50 ( $p < 0.001$ ) and the “somewhat dangerous” category decreases from 0.96 to 0.77 ( $p < 0.01$ ). That is, respondents who indicate that air pollution poses little or no danger to themselves and their families are 50% less likely to reduce car driving. Additionally, individuals who believe air pollution is somewhat dangerous are 23% less likely to reduce their car driving for environmental reasons than individuals who believe it is extremely dangerous.

The likelihood ratio test shows that Model 4 has significantly greater explanatory power than any of the previous models ( $p < 0.001$ ); consequently, we can interpret the odds ratios presented in that model with greatest confidence. It is important to note that increases in odds ratios across nested models cannot be interpreted in the same way that one would interpret an increase in coefficients. In other words, changes in odds from 0.50 to 0.75 with the addition of new variables does not necessarily indicate an interaction with other variables in the model. Instead, it is simply important to note that in Model 4 (the full model), significant and sizeable effects are shown, particularly with regard to the impact of policy on car driving behavior.

### *Discussion*

As shown above, my findings show support and opposition for my micro-level hypotheses. The results of my age variable contradict my third hypothesis which states that younger individuals are more likely to reduce their car driving for environmental. Instead, the results indicate that older individuals are more likely to reduce car driving.

One potential explanation for this is that older individuals did not have access to cars as early in life as younger generations. Reporting on 17 European countries, Giges (1991) reports that car ownership increased dramatically in the 1990s. Combined with the EU transportation infrastructure that favors alternative modes of transit, older individuals may be more accustomed to walking or biking than younger individuals, who grew up with more automobiles; hence they may be more willing to make the lifestyle “sacrifices” necessary to improve the environment.

Females are more likely to reduce their car driving, which is consistent with most environmental behavioral research. One factor could be the nurturing disposition of women, which may contribute to greater care and protection of the environment (Mohai 1992). Though I do not hypothesize about the precise effect of environmental concern on behavior, both questions measuring individual concern significantly affect individual behavior. It is important to remember that individual concern alone is not adequate to predict individual behavior. However, as my results show, individual concern towards a specific behavior (rather than a general behavior, i.e. protecting the environment) may better predict an individual’s engagement in that specific behavior.

Contradicting my second hypothesis and studies by Dietz, Stern, and Guagnano (1998) and Engel and Potschke (1998), my findings show that individuals at or above the national income average are 10% less likely to reduce their car driving. However, government leaders often assert that in order to protect the environment, individuals will need to make “tradeoffs” (Gore 2006). For example, an individual may want to buy a hybrid car, organic food, energy-saving light bulbs, and take public transportation; however, the monetary and time cost are much greater than driving her current, 10-year

old car, purchasing incandescent bulbs, and shopping at the discount grocery store across the street from her child's daycare. If the individual chooses the less environmentally behaviors, it would be incorrect to state that this individual does not value the environment; further, it would be incorrect to state that s/he would not protect the environment given different circumstances. Understanding the limitations and circumstances that compel individuals to engage in environmental damaging behaviors may provide insight into what specific government policies or actions could effectively alter individual behavior (Dietz, Stern, and Guagnano 1998).

Olsson, Akiyama, Garling, Gustafsson, and Loukopoulos (2006) provide an example of how the government, through subsidies, may remove the individual's need to choose between economic and the environmental benefits. The authors find that subsidies contribute to reduced greenhouse gas emissions while maintaining market competition. They conduct an experimental simulation of an energy market by allocating a given number of energy units to producers. Producers can sell any unused units to the government for a guaranteed price (subsidy) or sell to another producer. Olsson and his colleagues find that by guaranteeing a certain level of income, subsidies provide market security for the producer. Thus, producers can reduce their cost and implement more environmentally friendly technologies. This finding supports literature suggesting that government actions affect decisions at the individual level. Further, it supports the public consensus that the leaders of the United States government need to intervene to address climate change (PEW Research Center 2007).

In western, capitalist societies, the economic/environmental tradeoff is one of the most obvious and pressing for most individuals. My results support that individuals

living in EU nations may be facing this tradeoff. Employed individuals are less likely to reduce their car driving than unemployed individuals. Professional, technical, and manual workers are between 12 and 17 percent less likely to reduce car driving than respondents who indicate that they are not employed full-time or part-time. Kohn (1977) suggests that job type influences an individuals' access to the modes of production, and as such, influences their ties, or conformity, to the system. In other words, individuals who are employed may be less likely to trade economic security in order to protect the environment, believing that they have more to gain by maintaining the status quo.

Additionally, for working individuals to arrive at work everyday at a specific time, especially in areas with limited public transportation, a car may be the only option. Also, in order to maintain other personal responsibilities, e.g. children and spouses, individuals may require flexible transportation; for example, the meager public bus schedule may not facilitate an individual going to a grocery store *and* picking up his child from daycare by 6:00 pm. Though this individual may be concerned about car pollution, he is faced with a tradeoff: he can shift his schedule to facilitate work, grocery shopping, and childcare with public transport or he can drive his car. Individuals with less strict time commitments as well as less stock in the current social system, e.g. unemployed, no children, and unmarried, may be more likely to reduce their car use to protect the environment.<sup>7</sup>

---

<sup>7</sup> Arguably, the majority of EU societies are capitalist, comprised of individuals who highly value economic success; thus, though European citizens may perhaps rank the importance of environmental protection higher than citizens of the United States, a healthy economy may often outrank the environmental protection among Europeans. Thus, the effects of economy and environmental tradeoffs may function similarly in both countries.

Though my study includes a measure of respondent urbanicity, this variable does not significantly affect an individual's car driving. However, I argue that respondent that urbanicity can influence individual behavior; for example, by including city size and the coverage and accessibility of public transportation within the measure of urbanicity (my variable does not include these factors), future research may better address the purpose of this study: to understand how environmental policy climate (including public transportation) affects individual behavior.

### *Conclusions*

My results indicate that macro-level factors influence individual car driving behavior. Each macro-level indicator shows a significant positive effect on the reduction of individual car driving. These findings support my first hypothesis which states that respondents with higher Environmental Sustainability Index scores will be more likely to reduce car driving for environmental reasons. As stated above, institutional structure is a primary determinant of the available choices for the individual; further, the government actions create a specific "policy climate" surrounding environmental issues, affecting how individuals perceive these issues. Thus, with a greater number of environmental actions by the government (including subsidies for alternative fuel/public transportation, less subsidies for oil companies, involvement in international climate change agreements, and stricter environmental laws) individuals desire to engage in environmental friendly behaviors, such as riding the train instead of driving a car, may increase.

Though all EU member states are bound to the same Kyoto Protocol guidelines, individual countries may implement their own strategies and policies to meet these guidelines. Thus, though a nation's international commitment to decrease emissions may influence the individual, this commitment represents only the first step in decreasing national greenhouse gas emissions. It is my assertion that in order to see a significant change in an individual behavior, the government must take several steps to create a "climate" which compels and enables an individual to engage in the desired behavior. Without legislative guidelines and legal consequences, individuals voluntarily choose whether or not to decrease car driving. Thus, to impact greenhouse gas emissions by reducing voluntary car use, governments must take consistent actions that are visible, understandable, and acceptable to the public.

It is also imperative to examine how public pressure has influence government change. Future studies on alleviating global warming may benefit from examining the relationship between environmental movements and environmental policy change in areas with decreasing greenhouse gas emissions. By understanding the specific social climate present in areas reducing emissions, other local, state, and national governments are provided with a blueprint which they can modify to their specific needs. By facilitating the sharing of environmental successes and failures, state and national leaders can improve current policies; additionally, understanding the needs and limitations of the public should be considered before engaging in binding government action. A well-educated government can lead by example and provide the tools necessary for the public to follow.



## **List of References**

- Adams, Leah D. 2006. "Changes in Policy and Practice: A Global View." *Childhood Education* 82(6): 322-323.
- Berger, Ida E. 1997. "The Demographics of Recycling and the Structure of Environmental Behavior." *Environment and Behavior* 29(4):515-531.
- Blocker, T. Jean and D.L. Eckberg. 1989. "Environmental Issues as Women's Issues: General Concerns and Local Hazards." *Social Science Quarterly* 70:586-593.
- Bohon, Stephanie A., K. Stamps, and J.H. Atilas. Forthcoming 2008. "Transportation and Migrant Adjustment in Georgia." *Population Research and Policy Review*.
- Buttel, Frederick H. 1979. "Age and Environmental Concern: A Multivariate Analysis." *Youth and Society* 10:237-256
- Daun, Holger and P. Siminou. 2006. "State, Market, and Civil Forces in the Governance of Education." *European Education* 37(1):26-45.
- Davidson, Debra J. and W.R. Freudenburg. 1996. "Gender and Environmental Risk Concerns: A Review and Analysis of Available Research." *Environment and Behavior* 28:302-339.
- De Almeida, Joao F.; F.L. Machado; A.F. da Costa; 2006. "Social Classes and Values in Europe." *Portuguese Journal of Social Science* 5:95-117.
- Dietz, Thomas; P.C. Stern; & G.A. Guagnano. 1998. "Social Structure and Social Psychological Bases of Environmental Concern." *Environment and Behavior* 30:450-471.
- Dobson, Ricardo; F. Dunbar and C.J. Smith. 1978. "Structural Models for the Analysis of Traveler Attitude-Behavior Relationships." *Transportation* 7:351-363.
- Dunlap, Riley E. and R.E. Jones. 2002. "Environmental Concern: Conceptual and Measurement Issues" in *Handbook of Environmental Sociology*, edited by Riley E. Dunlap and William Michelson. Westport CN: Greenwood Press.
- Europa. 2007. "Commission Plans Legislative Framework to Ensure the EU Meets Its Target for Meeting CO2 Emissions from Cars." <http://europa.eu/rapid/pressReleasesAction.do?reference=IP/07/155>. Accessed July 27, 2007.
- European Environment Agency (EEA). 2004a. "Specific Emissions of Air Pollutants." Term 2003. Copenhagen, Denmark. [http://themes.eea.europa.eu/Sectors\\_and\\_activities/transport/indicators/technology/TERM28%2C2003.09/TERM2003\\_28\\_EEA31\\_Specific\\_emissions\\_of\\_air\\_pollutantsfinal.pdf](http://themes.eea.europa.eu/Sectors_and_activities/transport/indicators/technology/TERM28%2C2003.09/TERM2003_28_EEA31_Specific_emissions_of_air_pollutantsfinal.pdf). Accessed May 8, 2007.

- 
- . 2004b. "Overall Energy Efficiency and Specific CO2 Emissions for Passenger and Freight Transport." Term 2003. Copenhagen, Denmark. [http://themes.eea.europa.eu/Sectors\\_and\\_activities/transport/indicators/technology/TERM27%2C2003.09/TERM2003\\_27\\_EEA31\\_Overall\\_energy\\_efficiency\\_and\\_specific\\_CO2\\_emissions\\_for\\_passenger\\_and\\_freight\\_transportfinal.pdf](http://themes.eea.europa.eu/Sectors_and_activities/transport/indicators/technology/TERM27%2C2003.09/TERM2003_27_EEA31_Overall_energy_efficiency_and_specific_CO2_emissions_for_passenger_and_freight_transportfinal.pdf). Accessed May 8, 2007.
- 
- . 2004c. "Analysis of Greenhouse Gas Emission Trends and Projections in Europe." EEA Technical Report. Copenhagen, Denmark. [http://reports.eea.europa.eu/technical\\_report\\_2004\\_7/en/Analysis\\_of\\_GHG\\_trends\\_and\\_projections\\_in\\_Europe.pdf](http://reports.eea.europa.eu/technical_report_2004_7/en/Analysis_of_GHG_trends_and_projections_in_Europe.pdf). Accessed July 30, 2007.
- Engel, Uwe and Manuela Potschke. 1998. "Willingness to Pay for the Environment: Social Structure, Value Orientations and Environmental Behavior in a Multilevel Perspective." *Innovation* 11:315-332.
- Feldman, David L. and L. Moseley. 2003. "Faith-Based Environmental Initiatives in Appalachia: Connecting Faith, Environmental Concern, and Reform." *Worldviews* 7(3):227-252.
- Fishbein, M. and I. Ajzen. 1975. *Belief, Attitude, Intention, and Behavior*. Reading, Massachusetts: Addison-Wesley.
- Fortmann, Louise and J. Kusel. 1990. "New Voice, Old Beliefs: Forest Environmentalism among New and Long-Standing Rural Residents." *Rural Sociology* 55:214-232.
- Frank, David John; Meyer, J.W. & Miyahara, D. 1995. "The Individualist Polity and the Prevalence of Professionalized Psychology: A Cross-National Study." *American Sociological Review* 60:360-377.
- Giddens, Anthony. 1984. *The Constitution of Society*. Cambridge: Polity Press.
- Giges, Nancy. 1991. "Great Change in Europe Lifestyles: Study." *Advertising Age*. 62(9):17.
- Gill, James D., L.A. Crosby, & J.R. Taylor. 1986. "Ecological Concern, Attitudes, and Social Norms in Voting Behavior." *Public Opinion Quarterly* 50:537-554.
- Gore, Al. 2006. *An Inconvenient Truth*. Emmaus, PA: Rodale.
- Government of Ireland. 2004. "EU Enlargement: An Introduction." Accessed June 3, 2007. <http://www.eu2004.ie/>
- Gupte, Manjusha. 2002. "Gender, Feminist Consciousness, and the Environment:

- Exploring the “Natural” Connection.” *Women & Politics* 24:47-62.
- Hays, Samuel P. 1992. “Environmental Political Culture and Environmental Political Development: An Analysis of Legislative Voting.” *Environmental History Review* 16:1-22.
- Heritier, Adrienne, C. Knill, and S. Mingers. 1996. *Ring in the Changes in Europe: Regulatory Competition and the Transformation of the State. Britain, France, Germany*. New York: Walter de Gruyter.
- House, James S. 1995. “Social Structure, Relationships, and the Individual” in *Sociological Perspectives on Social Psychology*, edited by K.S. Cook, G.A. Fine, and J.S. House. Boston: Allyn and Bacon.
- House, James S. 1981. “Social Structure and Personality” in *Social Psychology: Sociological Perspectives*, edited by M. Rosenberg & R.H. Turner. New York: Basic Books, Inc., Publishers.
- House, James S. and J. Mortimer. 1990. “Social Structure and the Individual: Emerging Themes and New Directions.” *Social Psychology Quarterly* 53(2):71-80).
- Inglehart, Ronald. 1997. *Modernization and Postmodernization: Cultural, Economic, and Political Change in 43 Societies*. Princeton, New Jersey: Princeton University Press.
- \_\_\_\_\_. 1990. *Culture Shift in Advanced Industrial Society*. New Jersey: Princeton University Press.
- Inglehart, Ronald and W.E. Baker. 2000. “Modernization, Cultural Change, and the Persistence of Traditional Values.” *American Sociological Review*.65:19-51.
- Inkeles, Alex and D.H. Smith. 1974. *Becoming Modern: Individual Change in Six Developing Countries*. Cambridge: Harvard University Press.
- Intergovernmental Panel on Climate Change (IPCC). 2007. *Climate Change 2007: The Physical Science Basis*. Geneva, Switzerland.  
[http://ipcc-wg1.ucar.edu/wg1/docs/WG1AR4\\_SPM\\_Approved\\_05Feb.pdf](http://ipcc-wg1.ucar.edu/wg1/docs/WG1AR4_SPM_Approved_05Feb.pdf).  
 Retrieved April 25, 2007.
- Jones, Robert E. 1998. “Black Concern for the Environment: Myth versus Reality.” *Society and Natural Resources* 11:209-228.
- Jones, Robert E. and R.E. Dunlap. 1992. “The Social Bases of Environmental Concern: Have They Changed Over Time?” *Rural Sociology* 57:28-47.

- Kanagy, Conrad L., C.R. Humphrey; and G. Firebaugh. 1994. "Surging Environmentalism: Changing Public Opinion or Changing Publics?" *Social Science Quarterly* 75(4):804-819.
- Kempton, William; J.M. Darley; and P.C. Stern. 1992. "Psychological Research for the New Energy Problems: Strategies and Opportunities." *American Psychologist* 47:1213-1223.
- Kitamura, Ryuichi; P.L. Mokhtarian; and L. Laidet. 1997. "A Micro-Analysis of Land Use and Travel in Five Neighborhoods in the San Francisco Bay Area." *Transportation* 24:125-158.
- Klineberg, Stephen L.; M. McKeever; and B. Rothenbach. 1998. "Demographic Predictors of Environmental Concern: It Does Make a Difference How It's Measured." *Social Science Quarterly* 79(4):734-753.
- Kuppam, Arun R. and R.M. Pendyala. 2001. "A Structural Equations Analysis of Commuters' Activity and Travel Patterns." *Transportation* 28:33-54.
- Kohn, Melvin L. 1977. *Class and Conformity: A Study in Value*, 2<sup>nd</sup> Edition. Chicago: The University of Chicago Press.
- Kohn, Melvin L. 1989. "Cross-National Research as an Analytic Strategy" in *Cross-Cultural Research in Sociology*, edited by Melvin L. Kohn. Newbury Park, CA: Sage.
- Kohn, Melvin L. and K.M. Slomczynski. 1990. *Social Structure and Self-Direction*. Cambridge, Massachusetts: Basil Blackwell.
- Kohn, Melvin L.; K.M. Slomczynski; K. Janicka; V. Khelko; B.W. Mach; V. Paniotto; W. Zaborowski; R. Gutierrez; & C. Heyman. 1997. "Social Structure and Personality under Conditions of Radical Social Change: A Comparative Analysis of Poland and Ukraine." *American Sociological Review* 63:614-638.
- Lau, Richard R. & M. Schlesinger. 2005. "Policy Frames, Metaphorical Reasoning, and Support for Public Policies." *Political Psychology* 26:77-114.
- Lauer, Robert H. and W.H. Handel. 1977. *Social Psychology: The Theory and Application of Symbolic Interactionism*. Boston: Houghton Mifflin.
- Lenschow, Andrea. 2002. "New Regulatory Approaches in 'Greening' EU Policies." *European Law Journal* 8:19-37.
- Liefferink, Duncan and M.S. Anderson. 1998. "Strategies of the 'Green' Member States in the EU Environmental Policy-Making." *Journal of European Public Policy*

5:254-270.

- Liska, Allen E. 1984. "A Critical Examination of the Causal Structure of the Fishbein/Ajzen Attitude-Behavior Model." *Social Psychology Quarterly* 47(1):61-74.
- Liu, James H.; K. Ikeda; and M.S. Wilson. 1998. "Interpersonal Environment Effects on Political Preferences: The 'Middle Path' for Conceptualizing Social Structure in New Zealand and Japan." *Political Behavior* 20:183-212.
- Macrory, Richard. 2006. "The Enforcement of EU Environmental Law" in *Reflections of 30 Years of EU Environmental Law*, edited by Richard Macrory. Groningen: Europa Law Publishing.
- Marsden, Greg and A.D. May. 2006. "Do Institutional Arrangements Make a Difference to Transport Policy and Implementation? Lessons for Britain." *Environment and Planning C Government and Policy* 24:771-789.
- Marshall, Stephen. 2000. "The Potential Contribution of Land Use Policies towards Sustainable Mobility through Activation of Travel Reduction Mechanisms." *Innovation* 13:63-79.
- Miller-Loessi, Karen. 1995. "Comparative Social Psychology: Cross-Cultural and Cross-National" in *Sociological Perspectives on Social Psychology*, edited by Karen S. Cook. Massachusetts: Allyn and Bacon.
- Mohai, Paul. 1992. "Men, Women, and the Environment: An Examination of the Gender Gap in Environmental Concern and Activism." *Society and Natural Resources* 5:1-19.
- \_\_\_\_\_. 1990. "Black Environmentalism." *Social Science Quarterly* 71(4): 744-765.
- Olander, Folke; J. Thøgersen. 1995. "Understanding of Consumer Behavior as a Prerequisite for Environmental Protection." *Journal of Consumer Policy* 18:345-385.
- Olsson, Lars E.; M. Akiyama; T. Garling; M. Gustafsson; and P. Loukopoulos. 2006. "Examining the Use of Subsidies for the Abatement of Greenhouse Gas Emissions through Experimental Simulations." *European Environment* 16:184-197.
- PEW Research Center. 2007. "Global Warming: A Divide on Causes and Solutions." <http://peoplepress.org/reports/display.php3?ReportID=303>. Retrieved May 8, 2007.

- \_\_\_\_\_. 2006. "Little Consensus on Global Warming: Partisanship Drives Opinion." <http://peoplepress.org/reports/display.php3?ReportID=280>. Retrieved May 8, 2007.
- Program on International Attitudes (PIPA). 2005. "Americans on Climate Change: 2005." The PIPA/Knowledge Networks Poll. Accessed May 30, 2007. [www.worldpublicopinion.org](http://www.worldpublicopinion.org)
- Pucher, John and J.L. Renne. 2005. "Rural Mobility and Mode Choice: Evidence from the 2001 National Household Travel Survey." *Transportation* 32:265-186.
- Rabe, Barry G. 2004. *Statehouse and Greenhouse: The Stealth Politics of American Climate Change Policy*. Washington, D.C.: The Brookings Institute.
- Raudsepp, Maaris. 2001. "Some Socio-Demographic and Socio-Psychological Predictors of Environmentalism." *TRAMES – A Journal of Humanities and Social Sciences* 5(4):355-367.
- Roberts, J.T. and B.C. Parks. 2007. *A Climate of Injustice: Global Inequality, North-South Politics, and Climate Policy*. Cambridge, Massachusetts: The MIT Press.
- Rosenbaum, Walter A. 2005. *Environmental Politics and Policy*, 6<sup>th</sup> Edition. Washington, D.C.: CQ Press.
- Sabatier, Paul A. 1998. "The Advocacy Coalition Framework: Revisions and Relevance for Europe." *Journal of European Public Policy* 5(1):98-130.
- Sbragia, A. and C. Darmo. 1999. "The Changing Role of the European Union in International Politics: Institution Building and the Politics of Climate Change." *Environment and Planning C: Government and Policy* 17(1):53-68.
- Schnieder, Stephen S. 2005. "Implementation of Kyoto Protocol Just a First Step." Center for Environmental Sciences and Policy. Freeman Spogli Institute for International Studies. Accessed May 30, 2007. <http://cesp.stanford.edu>.
- Schwanen, Tim. 2001. "Urban Form and Commuting Behaviour: A Cross-European Perspective." *Tijdschrift voor Economische en Sociale Geografie* 93(3):336-343.
- Schwartz, Shalom H. 1992. "Universals in the Content and Structure of Values: Theoretical Advances and Empirical Tests in 20 Countries." *Advances in Experimental Social Psychology* 25:1-65.

- Shanahan, Elizabeth A. 2004. "Paying for Environmental Protection: A Path Analysis." *Conference Papers – Western Political Science Association*. 2004 Annual Meeting. pp 1-20. Retrieved July 17, 2007. Available: Academic Search Premier.
- Soversoski, Marie. 2004. "EC Enlargement and the Development of European Environmental Policy: Parallel Histories, Divergent Paths?" *Reciel* 13(2):127-134.
- Sparks, P. and R. Sheperd. 1992. "Self-Identity and the Theory of Planned Behavior: Assessing the Role of Identification with 'Green Consumerism.'" *Social Psychology Quarterly* 55:388-399.
- Stern, P.C., T. Dietz, and J.S. Black. 1995. "The New Environmental Paradigm in Social Psychological Perspective." *Environment and Behavior* 27:723-745.
- Stern, P.C., T. Dietz, and G.A. Guagnano. 1995. "The New Environmental Paradigm in Social Psychological Perspective." *Environment and Behavior* 27:723-745.
- Stern, P.C., T. Dietz, and L. Kalof. 1993. "Value Orientations, Gender, and Environmental Concern." *Environment and Behavior* 25:322-348.
- Streck, Charlotte and D. Freestone. 2006. "The EU and Climate Change" in *Reflections on 30 Years of EU Environmental Law*, edited by Richard Macrory. Amsterdam: Europa Law Publishing.
- Talley, James. 2001. "Demographic Shifts and Green Values in Rural America: A Southern Appalachian Case." PhD Dissertation. Department of Sociology. University of Tennessee.
- The Gallop Commission. 2007. "Attitudes on Issues Related to EU Energy Policy." Eurobarometer. Flash EB Series #206. Retrieved May 8, 2007. [http://ec.europa.eu/public\\_opinion/flash/fl206a\\_en.pdf](http://ec.europa.eu/public_opinion/flash/fl206a_en.pdf).
- United Nations Framework Convention on Climate Change (UNFCCC). 2007. "Kyoto Protocol: Status of Ratification." Accessed May 30, 2007. [http://unfccc.int/kyoto\\_protocol/items/2830.php](http://unfccc.int/kyoto_protocol/items/2830.php)
- United States Department of Energy. Carbon Dioxide Information Analysis Center. Accessed May 30, 2007. <http://cdiac.ornl.gov>.
- US Environmental Protection Agency (US EPA). 2007. "Fuel Economy." Accessed May 30, 2007. [www.epa.gov/fueleconomy/](http://www.epa.gov/fueleconomy/)
- \_\_\_\_\_. 2003. "US Emissions Inventory 2003: Inventory of US Greenhouse Gas Emissions and Sinks: 1991-2001."



<http://yosemite.epa.gov/oar/globalwarming.nsf/content/resourceCenterPublicationsGHGEmissionsUSEmissionsInventory2003.html>. Retrieved May 4, 2007.

- 
- \_\_\_\_\_. 2001. "Executive Summary: Inventory of US Greenhouse Gas Emissions and Sinks: 1990-2001." <http://www.epa.gov/climatechange/emissions/downloads06/03ES.pdf>. Retrieved July 15, 2007.
- Van Liere, K.D. and R.E. Dunlap. 1980. "The Social Bases of Environmental Concern: A Review of Hypotheses, Explanations, and Empirical Evidence." *Public Opinion Quarterly* 44:181-197.
- Vogel, David. 2003. "The Hare and the Tortoise Revisited: The New Politics of Consumer and Environmental Regulation in Europe." *British Journal of Political Science* 33:557-580.
- Wernet, Christine A., C. Elman, & B.F. Pendleton. 2005. "The Postmodern Individual: Structural Determinants of Attitudes." *Comparative Sociology* 4:339-364.
- Wielemans, Willy. 2000. "European Education Policy on Shifting Sand?" *European Journal for Education Law and Policy* 4:21-34.
- Wilkenson, Bill. 1997. "Nonmotorized Transport: The Forgotten Modes." *Annals of the American Academy of Political and Social Science* 553:87-93.
- Winter, Gerd. 2006. "Matching Tasks and Competences in the EC Multi-level Environmental Administration" in *Reflections on 30 Years of EU Environmental Law*, edited by Richard Macrory. Groningen: Europa Law Publishing.
- World Economic Forum, 2002. *2002 Environmental Sustainability Index*. Access July 15, 2007. <http://montevideo.usembassy.gov/envindex.pdf>
- 
- \_\_\_\_\_. 2001a. *The Global Competitiveness Report*. Accessed May 30, 2007. <http://www.cid.harvard.edu/cr/>
- 
- \_\_\_\_\_. 2001b. *2001 Environmental Sustainability Index*. Accessed July 15, 2007. [http://sedac.ciesin.org/es/esi/ESI\\_01a.pdf](http://sedac.ciesin.org/es/esi/ESI_01a.pdf)
- Zito, Anthony R. 2005. "The European Union as an Environmental Leader in a Global Environment." *Globalizations* 2(3):363-375.

## **List of Appendices**

## Appendix 1. Individual Country Sample-Type

Country	Sample Type
Austria	Stratified Multistage Clustered Random Sampling; a weighting variable was computed, taking into account sex, age group, and province of residence
Bulgaria	Two-stage cluster sample, representative for the whole adult population of Bulgaria over 18 years
Czech Republic	Three-stage random stratified sample; stratification factor were regions; the basic sample unit was household;
Denmark	A simple random sample drawn from the <i>Central Population Register</i> by <i>Statistics Denmark</i> ; No stratification, clustering etc, was employed
Finland	Household population aged 15-74; A systematic random sample of individuals; Sampling Frame: Population register. Sorting Order: Domicile Code and birth date. Stratification: implicit geographic stratification; No clustering
West Germany	Name and address from respondents' registers kept by municipalities. Adult of 18 and older living in private accommodation.
East Germany	Name and address from respondents' registers kept by municipalities. Adult of 18 and older living in private accommodation.
Great Britain	Stratified random probability of adults 18+ living in private accommodation in Britain; Drawn from the postal address file; multi-stage design
Ireland	Three-stage clustered sampling approach; First, a random sample of PSU's was selected; second, a random sample of households; third, a random person in household was selected.
Latvia	Multistage stratified random sample, 18+
Netherlands	Sample of addresses (postal codes), respondent selection in households 16+
Northern Ireland	Postal Address File (PAF) used as sampling frame for the survey and a simple random sample of addresses was obtained after stratification into three geographic regions (Belfast, East of the Bann and West of the Bann).
Norway	Simple random sample from the Central Register of Persons aged 18-79.
Portugal	Stratified random probability of adults 18+ living in private accommodation in Portugal; sample method involved multistage design: stratification by region and habitat; selection of sampling units (100); selection of streets; selection of addresses by random root; selection of individuals by the last birthday method
Slovenia	Adults 18+ (excluded institutionalized people); Central Register of Population (a list of names and addresses constantly updated by public administration) is employed as a sampling frame. Two-stage stratified random sample; Clusters of Enumeration Areas (CEA) are stratified according to 12 regions*6type of settlement.
Spain	Multistage stratified random sample, 18+
Sweden	Representative sample of Swedish pop 18-79, postal survey

Appendix 2. Sample size after deletion of respondents who abstain from gender question and those who indicating that "I do not have or cannot drive a car"

Country	Number of Respondents
Austria	765
Bulgaria	406
Czech Republic	822
Denmark	872
Finland	1094
Germany (East and West)	1154
United Kingdom (Great Britain and Northern Ireland)	1270
Ireland	970
Latvia	490
Netherlands	1282
Norway	1272
Portugal	635
Slovenia	844
Spain	600
Sweden	913
Mean	893
N	13389

### Appendix 3. Hungary and Norway Occupation Recode

	Occupation	Recode as
<i>Hungary</i>		
2321	Secondary (high-)school teacher (academic track)	professional
<i>Norway</i>		
2511	Economic and social scientific planning and deliberation	professional
2512	Juridical planning and deliberation	professional
2519	Others within this group	professional
3341	Teacher in technical college	professional
3491	Information workers and journalists	professional
5134	Dental secretaries	technical/office worker
5135	Medical secretaries	technical/office worker
5164	Caretakers/houseporters	manual workers
5221	Shop staff/sales staff and other salesmen	manual workers
5223	Wholesale merchants	manual workers
7125	Joiner, formwork	manual workers
7126	Carpenters	manual workers
7144	Chimney sweepers	agricultural/elementary
7234	Shipmechanics etc.	manual workers
7350	Technical drawers	technical/office worker
7450	Laboratory assistants	technical/office worker
8341	Deck crew (ship)	manual workers

Appendix 4. Ordered logit effects of macro-, meso-, and micro-level predictors on reducing car driving (*coefficients and standard error shown*)

	Model 1	Model 2	Model 3	Model 4
Regulation & management	0.19 (0.04)			0.14 (0.04)
International cooperation	0.30 (0.06)			0.29 (0.07)
Subsidies	0.33 (.05)			0.55 (0.05)
Education		0.00 (0.01)		0.02 (0.01)
Lives in big city		-0.05 (0.05)		0.06 (0.05)
Religiosity		-0.02 (0.01)		-0.01 (0.01)
At or above average income		-0.14 (0.04)		-0.11 (0.04)
<i>Job type:</i>				
None		Reference		Reference
Elementary		-0.33 (0.08)		-0.14 (0.08)
Manual		-0.44 (0.04)		-0.20 (0.05)
Technical		-0.18 (0.05)		-0.13 (0.05)
Professional		-0.22 (0.05)		-0.17 (0.06)
Married or in union			-0.14 (0.04)	-0.05 (0.04)
Male			-0.22 (0.03)	-0.17 (0.03)
Age			0.15 (0.01)	0.13 (0.01)
<i>Danger to environment:</i>				
None or little			-0.57 (0.10)	-0.60 (0.10)
Somewhat			-0.26 (0.07)	-0.31 (0.07)
Very			-0.06 (0.07)	-0.08 (0.07)
Extreme			Reference	Reference
<i>Danger to family:</i>				
None or little			-0.32 (0.09)	-0.70 (0.09)
Somewhat			-0.04 (0.08)	-0.26 (0.08)
Very			-0.02 (0.08)	-0.11 (0.08)
Extreme			Reference	Reference
N	13389	13389	13389	13389
Likelihood ratio $\chi^2$	532.80***	141.05***	427.56***	1172.26***
Pseudo R <sup>2</sup>	0.02	0.00	0.01	0.04

## **Vita**

In 1998, Erika Lynn Borek graduated from Abington Heights High School in Clarks Summit, Pennsylvania. Following graduation, she proceeded to the Pennsylvania State University in State College, Pennsylvania to pursue a degree in environmental resource management with a focus in ecology. The highlight of her college career was spending a semester abroad in Tanzania, studying wildlife ecology and conservation. She received her Bachelor of Science degree in May of 2002.

After graduation, Erika moved to Eatonton, Georgia to work as an environmental specialist with the University of Georgia 4-H program. She taught children several subjects including lake ecology, herpetology, and Native American studies. Additionally, she led groups through challenge course activities to build team unity and trust.

In the spring of 2003, she enrolled in the Asian Bodywork Program at the Atlanta School of Massage. She received her National Certification in Massage Therapy certification and practiced fulltime for two years. Though massage therapy allowed Erika to care for people directly, but her passion for the environment was still strong. She decided to enroll in a graduate program that would combine her love for the environment and her caring nature.

In the fall of 2005, Erika began her graduate career in environmental sociology and policy at the University of Tennessee, Knoxville. Erika worked as a teaching assistant as she earned her degree. Upon graduation, Erika is moving to Maryland to pursue a career in environmental outreach and policy.